

150TH ANNIVERSARY OF
JOVAN CVIJIĆ'S BIRTH



SERBIAN ACADEMY OF SCIENCES AND ARTS

SCIENTIFIC MEETINGS / BOOK CLXII

PRESIDENCY | BOOK 10 / VOLUME I

150TH ANNIVERSARY OF JOVAN CVIJIĆ'S BIRTH

Proceedings of the International Conference
held at the Serbian Academy of Sciences and Arts,
October 12–14, 2015

Editors

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BELGRADE 2016



Publisher
Serbian Academy of Sciences and Arts
Belgrade, Knez Mihailova 35, Republic of Serbia

Technical Editor
Mira Zebić

Translator
Homework Translation Agency, Belgrade

Cover design
Dragana Lacmanović

Design
Raša Hindawi

Print run
500

Printed by
Colorgrafx

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FOREWORD

The Serbian Academy of Sciences and Arts marked the 150th anniversary of the birth of Serbia's and world's great scientist, academician and the president of the Serbian Royal Academy, Jovan Cvijić (1865–1927). The international scientific conference was organized from 12 to 14 October, 2015 dedicated to Jovan Cvijić's life and work. Over 100 papers were presented at the conference, within five different sessions: Life and Work; Geomorphology and Geology; Anthropogeography; Ethnology; Political Geography; Various Topics. Besides speakers from Serbia, the participants came from 15 European countries: Austria, Bosnia and Herzegovina, Bulgaria, Italy, Hungary, Germany, Romania, Russia, Slovenia, Turkey, Ukraine, France, Montenegro, Czech Republic and Switzerland. The Book of Abstracts was published in the English language, and these Proceedings include the papers accepted for publication based on positive peer reviews.

In addition to the Conference, a stamp featuring a Cvijić's portrait was issued to commemorate his great Jubilee, along with a golden plaque featuring his en face that was awarded during the opening ceremony of the Conference to individuals and institutions from Serbia and abroad in recognition of their contributions towards the development of scientific disciplines nurtured by Jovan Cvijić. An art exhibition was set up titled: *The Belgrade Atlas of Jovan Cvijić*, at the Gallery of the Serbian Academy of Sciences and Arts, with a catalogue in Serbian and English published to accompany the exhibition, along with a monograph in Serbian and English: *Jovan Cvijić – Life, Work, Times*.



LIFE AND WORK



GEOPOLITICAL IDEAS OF JOVAN CVIJIĆ

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ABSTRACT: Jovan Cvijić left a great scientific heritage in the field of anthropogeography. One of the important aspects of his work were numerous lectures and articles in which he presented his observations and views on geopolitical issues, such as the issues of geographical position of the Balkan Peninsula, economical and geostrategic position of Serbia after the Berlin Congress, the Macedonian question, the annexation of Bosnia and Herzegovina, and customs war with the "dualistic monarchy". In his geopolitical analyzes, Cvijić attaches crucial importance to the geographical position of Serbia and elaborates its spatio-physical, spatio-functional and historical determinants, seeking to observe Serbia in all its complexity, dynamism and processuality. This paper examines Cvijić's views on the geographical position of Serbia, the position and status of Bosnia and Herzegovina, Macedonian and Albanian issue or the issue of Macedonia's identity and Serbian-Albanian relations from the geopolitical perspective. Before and during the First World War Cvijić became involved in the scientific establishment of the Yugoslav idea, the unification of Serbs, Croats and Slovenes and demarcation of their common state. He even believed in the possibility of creating a "Yugoslav civilization", which proved to be, in the long run, a supra-confessional utopianism. Surprisingly, most reviews of Cvijić's scientific work in the field of anthropogeography and geopolitics, are one-sided and impressionistic, ranging between undervaluation and even uninformed evaluations at one end, and generalized, partly pathetic - glorifications, at the other. In this paper, an attempt was made to systematize and objectively assess the most important Cvijić's standpoints on specific geopolitical issues. Some of these standpoints have become topical again due to dissolution of the former Yugoslavia.

Key words: Cvijić, geopolitics, Balkans, Serbia, Yugoslavia

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INTRODUCTION

Jovan Cvijić (1865–1927), great geographer, lived in the “great and turbulent times”, in geospace “almost unknown to the rest of Europe”, brimming with numerous conflicts and political and territorial issues that required objective and profound geographical analysis. The idea of Yugoslavism cannot be properly comprehended and interpreted without its anthropo-geographical context elaborated by J. Cvijić. His work was an important instrument that influenced public opinion in Western Europe and their governments when the issues about Yugoslavia were resolved. In this brief exposé we will review only the most important views of Cvijić on the Serbian and Yugoslav issues, and some “sub-questions” which Cvijić elaborated in this context.

CVJIĆ’S VIEWS ON GEOPOLITICAL ISSUES OF SERBIA

Transitional position of Serbia. Cvijić’s political and geographical analysis of the position of Serbia includes not only spatio-physical, but also the spatio-functional and historical determinants, seeking to observe it in all of its complexity, dynamism and processuality (Grčić, 1996). Cvijić excerpts main determinants of the position of Serbia from geographic features of the Balkan Peninsula, deriving from physical and geographical counterpoints: mountain – lowland, sea – mainland. These are: 1) characteristics of merging and fusion, along with the extraneous, which give those characteristics transitional or Eurasian character; 2) characteristics of isolation and separation, which influence the formation of small geopolitical forms, isolated ethnographic regional groups. Regarding the first characteristics, Cvijić emphasized the *exposure* of Serbian geographical position as a “house on the road”, and *transitional* Morava-Vardar valley (Cvijić, 1921–II). Therefore, Cvijić assessed the situation of Serbia as “labile” and “dangerous”. Explaining the war objectives of Serbia in the First Balkan War (1912), Cvijić says: “Unfavorable political and geographical position of Serbia is well known. Serbia is located on the main communicational line that connects Central Europe with Thessaloniki, between the Austro-Hungarian Empire, which definitely occupied Bosnia and Herzegovina, a country with completely Serbian population, and between Turkey, consisting of numerous Serbian population (referring to the area known as “Old Serbia”, comment by M. G.), and almost in a constant state of anarchy” (Cvijić, 1996).

About the internal cohesion of the State. Considering severe internal social and dynamical conflicts, unstable social and economic circumstances in Serbia, Cvijić draws the following conclusion: "Our country provides a classic example of how a disadvantaged geographical and economic position can cause internal anarchy." Cvijić often emphasized the importance of transport and communications for integration and political cohesion of the country. "Our State is, by its natural structure, both geographically and economically, in a state of labile equilibrium. Ahead of us is a lot of work to bring our individual provinces closer by communications. It has yet to be made organically and connected whole, from hastily united country parts, a solid State, with reliable exports and normal economic pulsations" (Cvijić, 1922 – II, 215).

Serbian access to seaside as an "anti-ethnographical necessity". Cvijić had emphasized the goal of Serbia to create an access to a sea port, to which it could build a railroad and connect itself to the European market. According to Cvijić, this was an imperative, because of the provisions of the Congress of Berlin (1878) and the Austro-Hungarian annexation of Bosnia and Herzegovina (1908), "Serbia became an encircled state, and its inhabitants an enclosed people", as was conveniently voiced by English poet Garvin. Cvijić had pointed out that, if Serbia wants to access the Adriatic Sea, through the Drina valley, as was the most convenient way, it will have to occupy one ethnographically foreign area. "Such an occupation could be called an anti-ethnographical necessity" (Cvijić, 1913). However, Cvijić later abandoned this idea and Serbia has built a railroad across Montenegro to the Adriatic Sea.

About the size of state. Considering the circumstances of the economic and geographical position of Serbia, Cvijić stresses that "by provisions and consequences of the Treaty of Berlin, Serbia is economically locked, as in a mousetrap, and handed over to the mercy of dualistic monarchy. With annexation of Bosnia and Herzegovina, this position of Serbia is definitely fixed." In the same manuscript Cvijić categorically concludes that with this turn of events "the murderous geographic and economic positions are superimposed on Serbia." However, "despite the economical there is also a political threat to Serbia. Its small territory should remain only for a while, to be an insert between the Austro-Hungarian Empire and strengthened Kingdom of Bulgaria, twice as big as Serbia. Such economically suffocated political territory cannot be independent for long" (Cvijić, 1908; 1921–I). He noted the tendency of Serbia "to reach the Morava-Vardar valley and to create a strong viable state within the limits of this geographical environment" (Cvijić, 1922).

About the central core of the state. Cvijić built a “center-periphery” theory of sorts for devising the political space of the peninsula. Cvijić put Serbia into the “center” of events, intending for Serbia a role of “*Piemonte*” for uniting the isolated and separated Serbian historical territories and ethnographic areas. Afterwards, this became an old-radical political paradigm and the axiom for their doctrine of foreign politics. Geographic characteristics of merging and fusion, associated with longitudinal and transverse valleys, amplified by “metanastasic” migration streams, ethnic processes and cultural influences, all favor this idea. Under the pivot or core of the state, Cvijić includes: “... principle area of the country, from where awareness of the people’s state started, although in many cases it remains the backbone of the state life; this core is often a spatial incarnation of the state idea, the center from which the country is seen, towards this core is directed the view of every citizen of this country, when they rise up and look at the interests of their larger community” (Cvijić, 1966).

About European perspective of Serbia. The fact is that Jovan Cvijić always protested against accentuating the relation of his theory with “opinions of German geographers who wanted to make a moral weapon of physical geography for Germanic preparations for the implementation of their plan for world domination” (Archive of SANU, Cvijić’s f. 14460/III–Γ–a–10, f. 3). Cvijić predicted that “Serbia, because of its geographical position and ethnographic importance... may relate its national interests with those of Western Europe, and its national issues can become an European issue” (Cvijić, 1921). By “Western Europe”, Cvijić referred to France and Great Britain. Moreover, formula associated with Cvijić’s standpoints at the beginning of the twentieth century – Serbia as a natural focus of the peninsula, the center of political gravitation for the Habsburg Southern Slavs, the solid barrier to the German movement in the region – has become the “alpha and omega” of the French policy for Balkans. In expanded form, this concept has served as a strategic basis for the French political actions in Southeast Europe (Dimitrova, 1996). At the Versailles Conference after the First World War, two anti-Germanic states were created – Czechoslovakia in Central-Eastern Europe and Yugoslavia in the southeast, and they, together with Romania, formed the “Little Entente”.

ATTITUDES ABOUT CERTAIN GEOPOLITICAL ISSUES

About Bosnian-Herzegovinian issue. Cvijić believed that Bosnia and Herzegovina is “... the key to the solving of the Serbian question” (Cvijić,

1908), and “a heart of the Serbian people” in Yugoslav countries, which is similar to the concept of “Heartland” by British geographer H. Mackinder. At the same time, naturally, he did not deny the existence of Bosnian Muslims and Croats, but he pointed out that they had mainly Serbian origin. “As it is known, the Bosnian Moslems are Serbs, a substantial part of the Serbian nobility, who changed religion (especially Bogomil and Orthodox) and lost their national attachment (...) Oriental feelings and moods were added to their Serbian nature”. By criticizing the decisions of the Berlin Congress from year 1878, Cvijić points out that: “considering the minimum principle of nationality one must not give a central area and the nucleus of its nation to a foreign country, because that is what Bosnia and Herzegovina means to the Serbian people. Not uniting Bosnia and Herzegovina with Serbia and Montenegro, or at least not giving them an autonomy, but to hand them over to the Austro-Hungarian Empire, creates a labile balance, a hellish situation (...), a barrel full of gunpowder set up near a large fire that is licking at it from all sides” (Cvijić, 1908). Cvijić underlines that “outside of the Morava-Vardar depression in the western half of the peninsula there is no suitable area to set up a permanent state that could have normal economical and political life”. In Bosnia and Herzegovina, as well as in the other Dinaric areas “there can only be a mountainous country, due to difficulties and character of its population, but without a real life force, the interim state without economic and transportation conditions required for a real state. Economic and trade interests of certain Dinaric regions still aim for the Morava-Vardar depression; these areas cannot acquire life and importance unless they join the Morava-Vardar state, the organism that is strong enough from geographical and economical point of view”(Cvijić, 1916).

About the Macedonian issue. Discussing *the Macedonian issue*, Cvijić challenged the thesis about “greater Bulgaria” by which Macedonians are represented as Bulgarians. On the basis of linguistic maps and anthropogeographic research, he found that they are “neither Serbs nor Bulgarians,” but a “nation in the process of creation.” In his paper entitled “Some observations about ethnography of the Macedonian Slavs” (1906), Cvijić emphasizes that the Macedonian Slavs have no specific national feelings or national consciousness – neither Bulgarian, nor Serbian (Cvijić, J., 1987, vol. 4, ch.1). In his paper entitled “Order of Balkan People” (1913) Cvijić predicted that this “floating mass” will undoubtedly blend into either Serbs or Bulgarians, depending on whose boundaries of these two rival states would encompass Macedonia (Cvijić, 1916). V. S. Radovanović commented on this Cvijić’s standpoint: “The historical-social conditions

in late nineteenth and early twentieth century did not allow Macedonians to develop a separate Macedonian nationality. Therefore it is not a sin for Cvijić to name them Macedonian Slavs. The omission was made only for the territorial scope of this ethnographic mass of Macedonian Slavs, which were unjustly divided by Cvijić so that the north Vardar region with the region of Serbian Morava makes one ethnic entity, called "Morava-Vardar Serbs" (Radovanović, 1957).

About Albanian issue. In his studies of metanastasic migration and ethnic processes in Old Serbia, Cvijić showed that Albanians were expanding their ethnic territory and occupying the Serbian country. However, Cvijić is often criticized for the thesis about "*The anti-ethnographical necessity*", presented in the "*Serbian access to the Adriatic Sea*" (1913), as an attempt to prove certain territorial aspirations of Serbia at the Albanian expanse. "Memoirs" published in the meeting records of the Delegation of the Serbian-Croatian-Slovenian government in Versailles, in which Cvijić participated, state that the delegations "believed that the general interests of peace and serenity of Balkan Peninsula required that the Albanian territory, as was marked at the London conference, shall establish itself as an independent state, in the spirit of the decisions of this Conference. Such a solution would allow Albanian tribes to work on the formation of their own state that would be in line with the principle of "the Balkans to the Balkan peoples", which is essential for future serenity and peaceful development of the Balkan peoples." (Published in IDN, Belgrade, 1960). Approval of this attitude shows "Cvijić's consistent commitment and scientific determination that all Balkan nations should have the right to create their own states and to provide autonomy and cultural development to peoples who remain beyond their boundaries in the neighboring country" (Ćulibrk, 1982).

CVIJIĆ'S VIEWS ON THE YUGOSLAV STATE

About the idea of Yugoslavism. Cvijić's conceptual thoughts swayed between the ideas of Serbia and Yugoslavia. Cvijić believed that the Yugoslav state could arise if the center (Serbia) consolidated its surrounding peripheral zones (part of Pannonia and areas of Austro-Hungarian Empire), albeit for the benefits and interests of Western Europe (Cvijić, 1914; 1921,1991). One should point out that the concept of Western Europe at that time did not include Germanic cultural sphere or "Mitteleuropa" (Central Europe). The primary mission of Serbia Cvijić sees in linking and uniting divided parts of Serbia and other southern Slavs. However, the belief that the unification of Serbs, Croats and Slovenes would solve the

Serbian question as well as issues of other Southern Slavic nations turned out to be, in the long run, supra-confessional utopianism.

About state regulations. Little is known about Cvijić's advocacy for a united state regulated on the equal federal or regional basis. In this direction, one should seek characteristics of Cvijić's ethno-psychological types on the Balkans. In a letter to Ljubomir Stojanović from October 6, 1918, Cvijić states "I fully agree that the new state, if its existence comes into being (I am not, as you are, convinced that is absolutely certain), must have a federative structure with full equality of individual areas: The United States of Yugoslavia" (Trgovčević, 1986). Cvijić again, on the 27th of August the same year, pleaded for a federal state of the American type (Vasović, 2005). In the language of political diplomacy this means that there are essential geopolitical, ethno-psychic and geostrategic conditions for the transformation of the Balkans in the united independent states of the Balkans, modeled after the United States.

About Yugoslavia's borders. As an expert in the Serbian delegation at the Peace Conference in Paris after World War I (1919), Cvijić chaired the ethnographic and historical section of the Yugoslav delegation and was primarily responsible for determining the boundaries of the Kingdom of Serbs, Croats and Slovenes. Cvijić, with his ethnic maps and expertise, contributed to a more just and more precise determination of some border sectors and helped to restrain requests from Bulgaria for Macedonia and south Serbia, from Romania for Banat, from Hungary for the north of Bačka and Baranya, Međumurje and Prekomurje regions, from Italy for Slovenia in the area of Bled and Dalmatia (which was already promised to Italy by the secret treaty signed in London in year 1915). At the same time, the Serbian delegation, striving for compromise, had to give up its claims for Medova bay in Albania, Vidin in Bulgaria, Timisoara in Romania, Baja and Pecs in Hungary, Jader (Zadar) and Fiume (Rijeka) in Italy. For Carinthia Cvijić negotiated a right to plebiscite (results of which turned out to be quite disappointing to him).

About the "Yugoslav civilization". In the paper known as "Fundamentals of South Slavic Civilization" (1922), Cvijić begins with the assumption that "by combining various cultural influences", one can create original "South Slavic civilization - the ultimate and main objective of our state," which should "find an intimate contact with a larger environment, with slavism", and that it should "in certain directions absorb the overall and Slavic spirit and Slavic civilization" (Cvijić, 1922), which is an idea close to panslavism. However, the creation of a "Yugoslav civilization" was interrupted by disintegration of the common state and ethno-religious civil wars.

CONCLUSION

Cvijić, both during his lifetime and after his death, faced the fierce criticism by various serbophobic nationalists, and was also “often accused by our national chauvinists”. Today from the distance of hundred years and more, it is easy enough to deny Cvijić’s accomplishments, or to question his honest patriotism and criticize his sometimes contradictory conclusions on the basis of subsequently collected facts. Without the benefit of foresight and with modest technical means, he could not adequately analyze the collected materials. Whatever the outcome, Cvijić established a scientific format for geopolitical issues, which are back on the daily agenda with the breakdown of the old geopolitical structure in the Balkans and the emerging of the new one.

ACKNOWLEDGEMENTS: This article is a part of the project No. 176017, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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COMING FROM ABROAD: THE DISCOURSE ON SCIENTIFIC CENTRALISM AND CVIJIĆ'S STUDIES IN VIENNA

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ABSTRACT: The life of Jovan Cvijić and his contributions to ethnography and physical geography are embedded in the context of nation-building in pre-war Europe. By enforcing the cultural construction of racial and linguistic entities, young scientists of different parts of the Austro-Hungarian Empire and the Balkan Peninsula took part in the nationalization of scientific communication and knowledge transfer. This process started not earlier than in the second part of 19th century, when the common scientific usage of the German language was recognized as a symbol of cultural hegemony and imperial dominance. In particular, the concept of centralization became visible not only in the circulation of scientific knowledge, but also in the development of universities, their rank in society and the travels of scholars and students from Central Europe's periphery. In contrast to his later involvement in Serbian politics and territorial claims, Cvijić had decided to continue his studies in physical geography and geology at the University of Vienna. As a state scholarship holder, he stayed intermittently from 1889 to 1893 getting in touch with Penck's and Suess' concepts on geotectonics. Graduated in 1893, Cvijić published his fundamental doctoral thesis "Das Karstphänomen" in German and returned to Belgrade, where his book was translated to Serbian two years later. Through historical discourse analysis, the paper examines Cvijić's activities in Vienna from the viewpoint of centre-periphery and sociocultural influences on the production of scientific knowledge. Sources for this research comprised different archive materials as Cvijić's academic record from the University of Vienna.

Key words: Cvijić, centralism, nation-building, Vienna, karst

INTRODUCTION

Being a scholar can mean travelling abroad to conduct research in scientific libraries or collections, share ideas with international colleagues

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Fig.1. Jovan Cvijić around 1893,
photographer: Milan Jovanović
(*Photographe de la Cour, Belgrade*)

or work in the field. As other practices of science, the epistemological relevance of travelling and its forms changed over the centuries. In particular, field research emerged in the 18th century, when empiric-based earth sciences required the need to travel to foreign destinations. As well, the international exchange of students between different universities and research institutes is nothing new and can be dated back to the beginning of the so-called Republic of Letters (*Respublica literaria*) in 17th century Europe and America when communication in the scholarly community was realized by correspondence and personal visits of foreign colleagues.

Otherwise, travelling cannot be only used for an intellectual exchange, but also included social experiences. These are based on cultural patterns which travelers bring from home and influence the visitor's perception of foreign countries. In the case of the 28-year-old Jovan Cvijić (Figure 1), who has spent three years of study at the Department of Geography in Vienna to obtain his PhD, the atmosphere of this multi-ethnic, multi-religious and prosperous boomtown and melting pot of 1½ million citizens must have been fascinating. Nevertheless, statistically Jovan Cvijić's studies at the University of Vienna represent an exceptional case. In the late 19th century, the group of students born outside the Habsburg Empire was small as a percentage of the total enrollment and the share of students whose mother tongue was German increased obviously from around 60 percent in 1870 to more than 70 percent in 1900 (Cohen, 1987).

In the 1880s, the university's just inaugurated new main building, designed as "a palace of knowledge" in the center of the Austro-Hungarian Empire, was understood as a scientific answer to the increasing disintegration of Habsburg's borderlands and as a symbol of German-centered cultural hegemony. In an empire without overseas belongings, science had an imperialistic function, compensating the lack of territorial growth by undertaking international recognized scientific expeditions. Otherwise a form of "internal" colonization in Bosnia was initialized by extensive data-gathering, surveying and cartographic projects on the Balkan Peninsula with the neo-absolutistic aim to establish unity after the revolution of 1848 (Ash & Surman, 2012; Beer, 2004).

The special interest in geomorphologic questions, which emerged during the 1880s at the Department of Geography in Vienna, increased through extensive fieldtrips of professors like Albrecht Penck and his students to the monarchy's borderlands and can be recognized in the context of imperialistic ambitions in science (Clewing & Pezo, 2005). In addition, economic reasons were of interest. Especially the karst phenomenon as a typical landscape form of industrially underdeveloped regions in the

periphery of the Austro-Hungarian Monarchy obtained attention, when floods in several poljes of Carniola reduced the harvest and overgrazing and forest clearance led to karst formation around 1885. Further impulses were set by the intent of the municipal of Trieste to tap the water resources of the underground river "Reka" and by the occupation of Bosnia-Herzegovina, a region with a high percentage of karstified landscape, with Austrian forces in 1878.

Understanding itself as a contribution to Cvijić's biography and work, the paper will focus on Cvijić's studies in Vienna under the centre-periphery discourse and examine sociocultural influences on the production of scientific knowledge, using the method of historical discourse analyses. Sources for this research comprised different archive documents as Cvijić's academic record from the University of Vienna.

SCIENTIFIC NATION BUILDING IN CENTRAL EUROPE AND THE BALKAN PENINSULA

The Center–Periphery Discourse

In science, the exchange of students is often predicated on an imaginary geography of scholarly centers and periphery: while talented students are sent to specialized centers, their graduates go back to the periphery obtaining honorable positions in subcenters, where they continue the work of their teachers and serve as an incarnated proof of the center's reputation. For example in the Habsburg Empire, the possibility to get a professorship in Vienna required the need to have taught in an other university of the monarchy previously.

Otherwise, centers always require a counterpart to be recognized and the peripheries take center stage: directed from Vienna, imperial projects like the 24-volume "Kronprinzenwerk", a description of the different landscapes, ethnic groups and their culture in Austro-Hungarian Empire in words and images, pursued the strategy to construct an imagery of the Dual Monarchy as a "naturalized unity" with distinctive borderlands (Maner, 2005). Simultaneously, central museums like the Natural History Museum in Vienna collected objects of different territories creating a big picture of the monarchy and its regions.

Post-colonial studies had discussed the simplicity of the above mentioned dichotomy, pointing out that the dualism of the center–periphery concept deny the existence of local knowledge production and regional scientific centralism (Feichtinger et al., 2003). Especially, the foundation of

national academies of science and universities in different parts of the Austro-Hungarian Monarchy and the Balkan Peninsula formed a multiplicity of centers and peripheries, where the creation of national identities was enforced by developing an own scientific terminology and national language (Kamusella, 2012). In addition, former scientifically dependent territories can become centers as well, by copying the center's practices of dominance. It is hardly astonishing that Polish intellectuals described Germans in their community as both, "teachers and oppressors" (Ash & Surman, 2012).

Besides, the relationship between a professor and his students bases on personal reliance, loyalty and often unwritten commitment. A visual representation of this idea of personal reliance, scientific networks and schools of thought can be found in the Geological Archive of the Department for Geodynamics and Sedimentology in Vienna, where Jovan Cvijić's geological hammer is stored (Figure 2). The collection of geological hammers date back to Eduard Suess, who requested them from his colleagues and former students on different occasions.



Fig. 2. *Jovan Cvijić's geological hammer in the Geological Archive of the Department for Geodynamics and Sedimentology (University of Vienna)*

The selection of hammers was anything else than arbitrary and followed an idea of imaginary connection and arrangement between the scholars realized through the presence of their hammers. Marianne Klemun (2011, 2014), who has carefully examined the cultural and scientific context of this unique collection, has interpreted the subsequent arrangement of these hammers around a bust of Eduard Suess in the Department of Geology in Vienna as a "cultic portal of memory" symbolizing a "mutual recognition" of scientific colleagues. Although Cvijić immediately left Vienna after graduation to obtain a full professorship at *Velika škola* in Belgrade and got engaged in the development of the education and university system in Serbia during the following years, his hammer stayed in Vienna as a representation of his imaginary presence. The elaborate decorations on the hammer's shaft served as an identifying feature and personalized the tool for his owner.

In accordance to similar developments in European politics at the turn to the 20th century, competition in science was regarded more and more as a question of national superiority (Turda, 2004). In this context Cvijić has refused his appointment to a full professor of physical geography at the Czech University in Prague in 1903. Only four years later, when Cvijić was invited to Vienna to give a lecture on the genesis of the "Danube Gorge-Iron Gates", the Serbian newspaper "Politika" reported: "The lecture was attended by all members of that Society: Professors and doctors of geography and geology at the University of Vienna, one Austrian general and great number of students, mostly Slavs. After the lecture, there was an expert discussion between Mr. Cvijić and Viennese professors: Mr. Cvijić came out as a winner." (Stevanović & Mijatović, 2005, 17).

Central Europe and the Balkans – Language Issues

Due to the growing relevance of language issues in science, the use of German, French or English in scientific publications of the late 19th century provided not only a basis for communication but also represented a cultural and scientific hegemony. For Cvijić, his studies in Vienna brought his German to perfection and allowed him to build up international networks. Even his PhD thesis "Das Karstphänomen" (1893) was written in German and a Serbian translation got published only two years after the German version. Decisive experiences for his engagement in national politics were his field trips to Macedonia and Bosnia-Herzegovina in 1897 and 1899, where the knowledge of "the mostly dishonest and superficial foreign literature about these both provinces" let feel him "pain", and increases his "love of national unity" (Čubrilović, 1987, 86). Upset after the annexation of Bosnia-Herzegovina, Cvijić even ran into the trap of saying that these regions represent a territory of a "purely Serbian race" (Cvijić, 1909).

Cvijić's later competent use of French and English in scientific publications and his distinct addressing to the victorious powers in Paris and London were a nationalistic issue and corresponded to the political revolution in Central Europe and the Balkan Peninsula after the World War I: "But the civilization of Central Europe has been able only in a limited way to influence the mentality and the spirit of the Balkan peoples, particularly those of the independent Balkan states. In Serbia the spirit of society is totally different. Numerous men have been trained in Western Europe, particularly in France, and the rest have also adopted Western ideas. The institutions, although based on national tradition and spirit, are more related to those of Western than to those of Central Europe. There is in the independent Balkan states and especially in Serbia a marked tendency to

create, out of the various civilizational influences and by drawing on native resources, an original national civilization. The case is not entirely the same in Bosnia and particularly in Croatia and Slavonia, where foreign rule considerably impedes the maintenance of national tradition.”(Cvijić, 1918).

Cvijić’s image of the sociocultural conditions on the Balkan Peninsula, described in the last paragraph, based on a clear anthropogeographic dichotomy between Western Europe, Central Europe and the Balkan. For his contemporaries, this order was linked closely to a stereotypic civilisatory hierarchy. Emerged around 1800, the term “Central Europe” represents a mostly intellectual construct, whose semantic and topographic meaning changed over centuries quite dramatically. Mostly used to contrast the Balkan Peninsula with Central Europe, the term described a variously defined region lying between the areas of Western and Eastern Europe.

As the Bulgarian scholar Maria Todorova (2009) has argued in her recognized book “Imagining the Balkans”, the raise of the cultural prestige of the term “Central Europe” went hand in hand with the stigmatization of the Balkan area, which was identified with political instability, uncontrollable conflicts, backwardness and primitivism of its inhabitants. These negative stereotypic images of the Balkan Peninsula began to dominate in the European discourse not until the beginning of the 20th century when civil victims during the Balkan Wars and a bloody *coup d’état* in Belgrade in 1903 were indicted by the international press. Similarly, the image of the Balkan as a “powder keg” and “Europe’s backyard” can be seen in the context of the historical center-periphery discourse, which identified the former sphere of influence of the Ottoman Empire as a forgotten area on Europe’s mental map, squeezed between occident and orient (Csáky et al., 2006).

In his study “Questions balkaniques”, Cvijić (1916) unconsciously adopted the stereotypic concept of Western Europe as a hoard of civilization and science, while Central Europe, primarily the Austro–Hungarian Empire, was described as oppressors, which had little influence on the history of the Balkan Peninsula. This point of view stands in stark contrast to Cvijić’s own biography and academic career, which was probably more influenced by his teachers and experiences in Vienna, than Cvijić would have agreed in his later years.

JOVAN CVIJIĆ IN VIENNA

As other young scholars of the late 19th century, who have grown up on the Balkan Peninsula, Cvijić was forced to go abroad to continue his academic

career as a postgraduate due to the lack of an adequate university education in his home country. Because of the early stadium of state formation in Serbia, the high school *Velika škola* in Belgrade was transformed to a university not until 1905, when Cvijić became one of its 8 full professors (Čubrilović, 1987; Vasović, 1994).

As a graduate of the Department of Sciences and Mathematics at *Velika škola*, Cvijić obtained a scholarship of the Serbian state. For this reason, he could travel to Vienna, at that time with around 7000 students the biggest university town of the German-speaking countries. Besides Vienna's force of attraction as a booming metropolis, the university management has already established a professorship for geography, hold by Friedrich Simony, in 1851, and continued its ambitions in that new scientific discipline with the foundation of a Department of Geography in 1884. Besides similar departments in Berlin and Göttingen, the university institute was the only one of its kind in Central Europe. This newly founded institution was divided in two chairs, which were dedicated to physical geography and anthropogeography (today: human geography) and held by Albrecht Penck and Wilhelm Tomaschek (Bernleithner, 1965). Especially, the anthropogeographical section of the Department had a clear scientific focus on the political and historical development of the Balkan Peninsula, which became even stronger through the studies of Nobert Krebs, Hugo von Hassinger and Karl von Loesch after Cvijić has left Vienna. The reputation of Eduard Suess (since 1862 professor for geology) must have been an important factor to choose Vienna instead of cities in Western Europe as a place for Cvijić's studies. In particular, Suess' monograph "Das Antlitz der Erde" (1883) has become an international recognized textbook for students, which was surely known by Cvijić even before he has decided to come to Vienna. Prior to his matriculation, Cvijić had to provide translations of his diplomas from secondary school and *Velika škola* in Latin and French (Figure 3). During his first semester as a student, he used the German equivalent of his first name "Johannes" or "Johann" in the record of study and the official registration list of all students, which was significantly called "Nationale" (nationality). Similar to his growing interest in national roots, Cvijić changed his first name to its Serbian equivalent not until the end of his studies in Vienna.

Cvijić's stay in the capital of the Austro-Hungarian Empire was shaped by a great mobility and was interrupted by several field trips to the Balkan Peninsula and his home country. During his three years of scholarship in Vienna, he had to change his apartment twice. From his accommodation in the street "Laudongasse Nr. 30", which is located in a walking distance from the university, he had to move to an apartment in

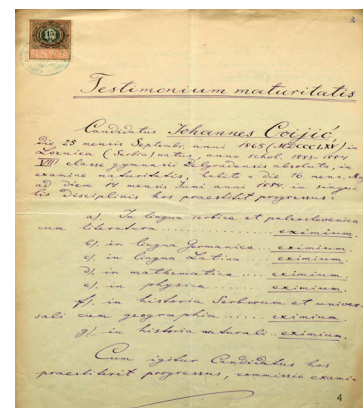


Fig. 3. Translation of Jovan Cvijić's diploma from secondary school qualifying for university matriculation. The certificate is written in Latin (Archive of the University of Vienna)



Fig. 4. Historical postcard of the street "Laudongasse" in 1912, where Jovan Cvijić lived mostly during his studies in Vienna (Austrian National Library)

"Erdbergerlande Nr. 12/23". From there he headed back to a newly constructed house in the street "Laudongasse Nr. 43", where the physician James Moser, Cvijić's teacher during his second semester in Vienna, also had his residence (Figure 4).

Becoming a student at the end of the 19th century was a social privilege in many ways. Scholars had the possibility to retard or even shorten their military service and to get a high position in public administration after graduation. Professors were state officials and dependent on the state's sovereign, who could refuse their nomination. The appointment of a professor was also a political choice and was carried out by the Secretary of Education. Lectures started around 6 a.m. and ended around 8 p.m. Foreign students were rare and were forced to speak German. Moneyless scholars from the periphery were regarded as outsiders and could not join student associations, which were organized in national and religious societies and were mostly reserved for German-speakers. Otherwise the curriculum in Geography respected the student's individual interest in the subject of research. It is therefore very important to examine the selection of courses, which Cvijić has attended during his time in Vienna and which can be reconstructed through Cvijić's record of study, persevered in the university's archive (Figure 5).

It is remarkable, that the range of scientific fields, where Cvijić has heard lectures, was quite broad (Table 1). Besides geography, geology and hydrography, he attended courses in meteorology, physics, philosophy and

psychology, which he could use in his subsequent publications on the Balkan Peninsula. The main topics of his lessons in geography were circling terms, whose cultural implications and embedment in the center–periphery discourse are already discussed in the last chapter: Central Europe (5 hours per week), the Balkan Peninsula (5 hours per week), as well as the Austro-Hungarian Empire (in total 10 hours per week) and the Russian Empire (5 hours per week), which represented the two most powerful players in South-Eastern Europe.

Professor Dr. Dr. Penck, Kartographie	5	10.10			
Prof. Dr. Dr. Penck Geographisches Seminar	2		K.k. Univ.-Quästur 5. MAI. 92 WIEN	Penck	Penck
Prof. Dr. Dr. Penck Geographische Ausflüge	publ.				
Professor Dr. R. Linnemann Psychologie	4			Linneumann	Linneumann
Professor Dr. Jul. Hann Die wichtigsten Ergebnisse serbisch-magyarischer Beobachtungen	1		E. CEBECK k. k. Quästur	Hann	Hann
Prof. Dr. Dr. Penck Geog. Übungen für Vorgesessene	5		K.k. Univ.-Quästur 17 JUNI 92	Penck	Penck

Fig. 5. Jovan Cvijić's record of study (Archive of the University of Vienna)

In their paper on Cvijić as a nation builder, Konrad Clewing and Edvon Pezo (2005) have pointed out that the lectures in anthropogeography, which Cvijić has attended, had a mostly historical and political content. Due to the late 19th century's concept of nationhood, which should be proven through the idea of a long linguistic (and religious) unity, geographical phenomena were used to determine historical developments and political claims: "Not alone the extent of geographical influences on man and the relations of ethnic groups must be examined, but also the distribution of the different civilizations, as this is a factor which was in the past and remains in our day of great influence on all the ethnographical and anthropogeographical phenomena of the [Balkan] peninsula." (Cvijić, 1918).

Similarly, Cvijić's first publication as a student of the Department of Geography in Vienna was dedicated to a national question. With Penck's support, Cvijić has recalculated the surface area and medium altitude of the Serbian Monarchy after the territorial gains of the Berlin Conference in 1878. In the context of his function as a national builder, Cvijić's paper (1891) can also be read as imaginary demarcation of the territory of the Serbian monarchy; from that base on he scientifically justified further territorial claims in subsequent years.

Table 1. Lectures, which Jovan Cvijić attended between 1889 and 1892. This compilation was made on the basis of his record of study (Archive of the University of Vienna)

1st semester: (winter 1889)

Geography of Central Europe, 5 hours per week, Prof. Penck
 Geographical Seminar, 2 hours per week, Prof. Penck
 Structure of the Earth's Surface I, 5 hours per week, Prof. Suess
 Meteorology, 2 hours per week, Prof. Julius von Hann
 Exercises, 5 hours per week, Prof. Penck

2nd semester: (summer 1890)

Mathematical Geography, 4 hours per week, Prof. Penck
 Geography of the Flat Country in Germany's North, 1 hour per week, Prof. Penck
 Geographical Seminar, 2 hours per week, Prof. Penck
 Geographical Excursions, Prof. Penck
 Geographical Exercises, 5 hours per week, Prof. Penck
 Anthropogeography, 3 hours per week, Prof. Tomaschek
 Structure of Earth's Surface II, 5 hours per week, Prof. Suess
 Physics of the Atmosphere, 1 hour per week, Prof. Julius von Hann
 Exercises in Microphotography and Photography, 3 hours per week, Doz. James Moser
 Geology of the Alps, 3 hours per week, Doz. Franz Wähner

3rd semester: (winter 1890)

The Balkan Peninsula, 5 hours per week, Prof. Tomaschek
 The Geography of the Austro-Hungarian Empire I, 5 hours per week, Prof. Penck
 General Geology, 5 hours per week, Prof. Suess
 Geographical Seminar, Prof. Penck
 Geographical Exercises, 5 hours per week, Prof. Penck

4th semester: (summer 1891)

The Geography of the Austro-Hungarian Empire II, 5 hours per week, Prof. Penck
 The Russian Empire, 5 hours per week, Prof. Tomaschek
 General Geology, 5 hours per week, Prof. Suess
 Geographical Seminar, 2 hours per week, Prof. Penck
 Geographical Exercises, Prof. Penck
 Geographical Excursions, Prof. Penck
 Logic, 4 hours per week, Prof. Robert Zimmermann

5th semester: (winter 1891)

Morphology of Earth's Surface, 5 hours per week, Prof. Penck
 The Mediterranean Countries, 4 hours per week, Prof. Tomaschek
 On Eruptions, 2 hours per week, Prof. Eduard Reyer
 Discussion of the newest Geolog.-Mineralog. Literature, 2 hours per week, Dir. Theodor Fuchs

6th semester: (summer 1892)

Hydrography, 5 hours per week, Prof. Penck
 Geographical Seminar, 2 hours per week, Prof. Penck
 Geographical Excursions, Prof. Penck
 Psychology, 4 hours per week, Prof. Robert Zimmermann
 Important Results of Geomagnetic Observations, 1 hours per week, Prof. Julius von Hann
 Geographical Exercises for Advanced Learners, 5 hours per week, Prof. Penck

Well documented through Cvijić's record of study, Penck's methodological emphasis on field research, excursions, and practical exercises can be regarded as equally influential on his students and decisive for Cvijić's scientific socialization in Vienna. In particular, Penck set value on cartographical documentation on-site, from which Cvijić benefitted during his fieldwork for his PhD thesis. In later years, he transferred the methods of field research to his studies on history of migration on the Balkan Peninsula.

THE CONCEPT OF THE DINARIC KARST AS A PLACE OF NATIONAL IDENTITY

The idea to choose the karst phenomenon as the research subject for his thesis probably developed in Cvijić's mind during the Easter holidays of 1891. At that time, he travelled from Trieste to the Slovene Karst, further on from Istria down the Dinaric coast to Bosnia, from where he left for Vienna to visit a bit of the Moravian Karst afterwards. Besides his personal experience as a child, grown up in a karst country with a doline and a ponor near his family house in Loznica (Western Serbia), Cvijić mentioned in his PhD thesis (1893) two extensive field trips, undertaken to the western part of the Balkan Peninsula in 1890 and 1892, where he could gather a lot of data for his research.

In accordance with Cvijić's later publications, the karst landscapes not only represent a geomorphologic feature, but can also be identified as cultural space with unique traditions, legends and social practices of their inhabitants. Situated in the periphery of prosperous cities, karst landscapes often stood in a close relationship with urbanized centers and have been the travel destination of either tourists, scholars or other travelers over centuries because of the exoticism of their cavernous surface. Equally, Cvijić has visited several famous caves and other remarkable karst features with local guides-both as a tourist and man of science. During his research travels, special interest was led on destinations which were under foreign rule like Bosnia-Herzegovina and Macedonia. Sources like a photograph made on the occasion of Cvijić's fieldtrip to Bosnia in Cazin in 1921 (Stevanović & Mijatović, 2005, 385) showing a men with refined, cultivated manners and Western-Europe dress code among the Muslim inhabitants wearing traditional clothes, display Cvijić's distance from his own subject of research. – A scholar, who has come from the center of Belgrade to Balkan's periphery, in order to teach the natives and study their behavior.

Although his PhD thesis focused only on geomorphic phenomena and included no interpretations which could suggest a nationalistic con-

text, Cvijić described the field trips in his later correspondence in a quite different way: "During all my geological and geomorphological researches, I had a vision of the unity of your people before my eyes." (Čubrilović, 1987, 86) In his following publications, he raised the idea that the Dinaric Alps and especially the karst landscapes have forced the development of ethnic groups with specific cultural, social and linguistic similarities. As a basis for national unity, the karst landscapes of the Dinaric Alps represent a place of identity for his inhabitants:

"The Dinaric mountain type has lived through a period of martyrdom and has had to fight for its existence for centuries; but in spite of this it has produced a great deal and has shown considerable capacity. Its moral and intellectual qualities render it capable of reaching a high standard of civilization.... The whole Dinaric area has certainly produced some exceptionally heroic men, but it is the Dinaric Serbs who attain the highest degree of heroism, on account of their consciousness of nationality and because history has given them a special mission as a State. Men of the Dinaric type are conscious of a very strong link with Nature and with their ancestors-indeed, the sense of kinship with Nature is more highly developed here than in any other district. They recognize every natural sound- from the bubbling of the springs and the murmur of the leaves to the sounds that come from underground, and the shaking of the earth. The lofty and far-stretching mountains with their valleys and watercourses, and the grotesque forms of the great karst summits, to which they give fantastic names like 'The Bear' and 'The Twins' exercise a strong hold over the imagination of the people, and all the peculiarities of the karst country the rivers that disappear into chasms and reappear in distant caves; the great caves themselves, that stretch so far into the darkness; the intermittent springs and all the rest-play upon their fancy. They are symbolic of the place and exercise a constructive influence over the inmost recesses of the spirit of the nation."(Cvijić, 1930).

For the elder Cvijić, the Dinaric Karst represented both – a geomorphic phenomena and a source of national consciousness, which should unify all people of the same language. That this concept was already developed in Cvijić's mind, when he travelled through the regions of the later Kingdom of Yugoslavia as a student, is quite implausible, even though he was influenced by the idea of national superiority during his studies in Vienna. Accordingly, the excellent evaluation of his PhD thesis, written by his teachers Penck and Tomaschek, contained also a notice concerning Cvijić's German language skills, which was described as harmful for the thesis' linguistic conciseness and clarity (University of Vienna, 1893) (Figure 6).

Gütekritik über die Dissertation des h. Jovan Cvijić
"Das Karstphänomen".

Das überaus reich und auf einen wasserrechtlichen
Litharubium, sowie zum Theile auf andere, im österr. Reich
und im nördl. Theile gewisse Beobachtungen gegründete
Hoff. d. mathematisch geologischen und im Einzelnen sehr
genau und sorgfältig dargestellt.

Das Besondere der Arbeit — nämlich der Nachweis,
dass die Dolinen nur eine besondere Form der Gasterub-
auflösung durch Tageswässer darstellen und dass selbst
die Polje's und die mit ihnen verknüpften Karstbecken
gewissermaßen nur als Dolinen größerer Umfange zu
betrachten sind, welche naturgemäß als kammförmige
Einflüsse von oben auf erklärt werden können — dürfte
keinem Zweifel oder bezügl. seiner Richtigkeit irgendwo
eingestanden werden. Auf als eine sorgfältige Zusammen-
stellung aller auf das Karstphänomen bezügl. Thatsachen
verdient diese fleißige Arbeit publiziert zu werden.

Nur in einem Punkte dürfte der Naturforscher ein
Zustimmung als sprachen: ob möge der h. Vf. an allen
gestandenen Stellen entsprechende Belege beibringen und vor-
sichtigerweise sorgfältiger nachzugehen, damit der Inhalt der
Arbeit sofort übersehbar und zu Tage trete.

Wien am 13. Dezember 92.

Tomaschek.



Fig. 6. Review of Jovan Cvijić's PhD thesis "Das Karstphänomen" (1893) by his Czech teacher Wilhelm Tomaschek, who was appointed professor of geography in Vienna in 1885 (Archive of the University of Vienna)

CONCLUSION

One of Cvijić's main learning content, with which he got in touch during the anthropogeographic lessons, was the concept of nationhood and patterns of national history, which let him subsequently participate in the nation building process in his home country. Similarly, Cvijić's further career as a very productive and internationally recognized geographer, geologist and karst scientist cannot be seen apart from his political ambitions (Clewing & Pezo, 2005; Cvijić, 1907; Ćulibrk, 1971; Bartulin, 2012). As other protagonists of national movements in Central Europe and the Balkan Peninsula, Cvijić was searching for geographic, ethnic or cultural data to scientifically proof national unity. Thereby, he identified migration as an important social factor, determining the history of the Balkan Peninsula over centuries (Cvijić, 1923). Even before the annexation of Bosnia–Herzegovina by Habsburg forces, Cvijić (as some of his colleagues in Vienna too) strongly supported the idea of a preventive war between the Dual Monarchy and Serbia and the gathering of all people "speaking the same language from Istria to Macedonia" in an own state under Serbian guidance and with Belgrade as its capital (Cvijić, 1909). – These aims are based on concepts of centralism and national superiority, which Cvijić has experienced first-hand in Vienna 15 years before.

ACKNOWLEDGEMENTS: Thanks are due to the Speleological Research Group of the Natural History Museum in Vienna, the University of Vienna and the Speleological Society of Vienna and Lower-Austria for access to their archives and permitting me to publish items from them. I also thank Jelena Ćalić for her support and help to enhance the content of this paper.

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EDOUARD ALFRED MARTEL AND JOVAN CVIJIĆ: EXCERPTS FROM THE CORRESPONDENCE

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ABSTRACT: At the end of the 19th century, Edouard Alfred Martel started cooperating with karst scientists from many European countries, as a part of his international activities. One of the scientists that he worked with was Jovan Cvijić, a member of Martel's Société de Spéléologie from Paris since its establishment. The correspondence between them has not been known until now. This work provides a retrospective of their cooperation based on available documents, and especially based on some of Martel's letters which have been kept and preserved in the archive of the Serbian Academy of Sciences and Arts. These include a postcard (dated 1896), a letter (dated 1897) in which Martel notifies Cvijić about the status of his work for the magazine *Spelunca* on ice caves in Serbia, and a letter (1924) and a postcard (1925) regarding their meetings in Paris. The correspondence and its content, from two very different time periods, illustrate and substantiate their long acquaintance and cooperation.

Key words: E.A. Martel, J. Cvijić, *Spelunca*, *Société de Spéléologie*, correspondence

INTRODUCTION

Edouard Alfred Martel (1859–1938) was one of the most important figures from the end of the 19th and the beginning of the 20th century in the world of speleology and research of karst phenomena. He founded one of the most famous speleological societies *Société de Spéléologie* in 1895 in Paris. That same year magazine *Spelunca – Bulletin et Memoires de la Société de Spéléologie* was launched. During his career, he has visited or studied 230 speleological objects and 110 of them were vertical objects. He conducted research in many European countries, and in the Balkans he was active in

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Slovenia, Croatia, Bosnia and Herzegovina, Montenegro and Greece (Shaw, 1992). His importance for speleology is the best demonstrated by the fact that in the famous book *History of Cave Science* (Shaw, 1992) only Martel got his own separate chapter.

Martel's life and work are well researched and documented, both through many works that he has published, and through correspondence with many scientists and institutions which left behind him (Andre *et al*, 1977). Except in Slovenia, where at that time many speleological researches were conducted (Postojna cave, the Škocjan caves, research of the underground Reka), in other Balkan countries speleology was mainly in its early stage and on an amateur level. So, there are no local domestic sources which could tell us more about his research. There are no even archival records (for example from Bosnia and Herzegovina), even though it is known that Austro-Hungarian administration was very meticulous when it came to foreign visitors. In any case, Martel's relations with domestic researchers are poorly documented.

E. A. MARTEL AND J. CVIJIĆ

From domestic researchers, for now we only know of the two who were in contact with Martel: Viktor Apfelbeck from Sarajevo and Jovan Cvijić from Belgrade.

Viktor Apfelbeck (1859–1934), curator in the National Museum of Bosnia and Herzegovina, has become famous very early outside the country, thanks to the researches of cave fauna in Bosnia and Herzegovina. Already in his first published work he argues that he has researched 20 caves in central and eastern Bosnia, and he describes a few of the new species (Apfelbeck, 1889). He is establishing an intensive cooperation with entomologists in the world, and, probably, through the French Entomological society of which he has become a member of in 1893, he gets in contact with Martel (Anon., 1896). On the March 14th 1895, Apfelbeck was present at The inaugural meeting of *Société de Spéléologie* as delegate of the Government of Bosnia and Herzegovina, and during that occasion he read his work (Apfelbeck, 1895) about blind fauna in caves "in that country" (Anon., 1895b, p. 22).

Jovan Cvijić (1865–1927) has got in touch very early with Alfred Martel. In the first member issue of *Société de Spéléologie*, Cvijić is listed as a corresponding member (Anon., 1895a), and according to the member list, he is a member of society in 1904 and in 1909. (Shaw, 1988). Already

in the second issue of the magazine *Spelunca* there is Martel's display of Cvijić's book *Das Karst-Phänomen*, which was published only two years earlier (Martel, 1895) and which produced a great international impact. A display of the same book, right after its publishing, was done in English by Dr. T. G. Bonney (1893). In the first volume of the magazine *Spelunca*, Cvijić's work *La Grande grotte de Douboca, dans la Serbie orientale* (1895) was published, and Martel would later as an editor accept to publish works *Les glacières naturelles de Serbie* (Cvijić, 1896) and *Brusque formation d'unedolineen Serbie* (Cvijić, 1897).

There is not much data about relations between Martel and Cvijić. I did not receive any data about their relations from T. Shaw and A. Kranjc, who are most informed in the historical research of speleology and karst in this region (oral correspondence). I do not know if there are any published Cvijić's letters in the book about Martel's correspondence (Andre et al, 1997), because that book, except for pages about Martel in B&H, was impossible to get.

Therefore, it seemed interesting to disclose the existence of a few letters from Martel to Cvijić from two different time periods. I have found these letters on two microfilms, which were present in the archive of Speleological Society "Bosansko-hercegovački krš" from Sarajevo. On this document it can be seen that they belong to the Serbian Academy of Sciences and Arts. On the microfilms, except for Martel's letters and postcards to Cvijić, there are also Balif's letters, one Valeria's postcard, Karel Absolon's wife, one Valter Bohinec's letter, who was then a young PhD student in Heidelberg, and a few letters more. It is not known to me why those microfilms are in our archive, because there were not any supporting materials with them. It is also not known to me who from the former members of our society could have had an interest in it.

The oldest document is a postcard dated to 14. January 1896, which was sent from Paris (Figure 1). In it Martel was informing Cvijić that he has received his work about ice caves in Serbia and that it will be published in the first or the second issue of magazine *Spelunca* that year. Also, Martel was asked by Cvijić for one or two photographs that would illustrate the work.

The second document is a letter that was written on the memorandum of *Société de Spéléologie* (Figure 2). It was dated the 6th of August 1897, and was sent from Paris. In this letter Martel was informing Cvijić about the receiving of 30 francs and was sending him the confirmation about it. He also shortly informed him that he had received two photographs and that the work about ice caves would be published in the next issue of

magazine *Spelunca*. This was about the aforementioned work *Les glaciers naturelles de Serbie* that was published in the issue 6–7 (April–June and July–September 1896). The date remains unclear (1897), but Martel was known for his bad handwriting (editor's comment, Andre et al., 1997).

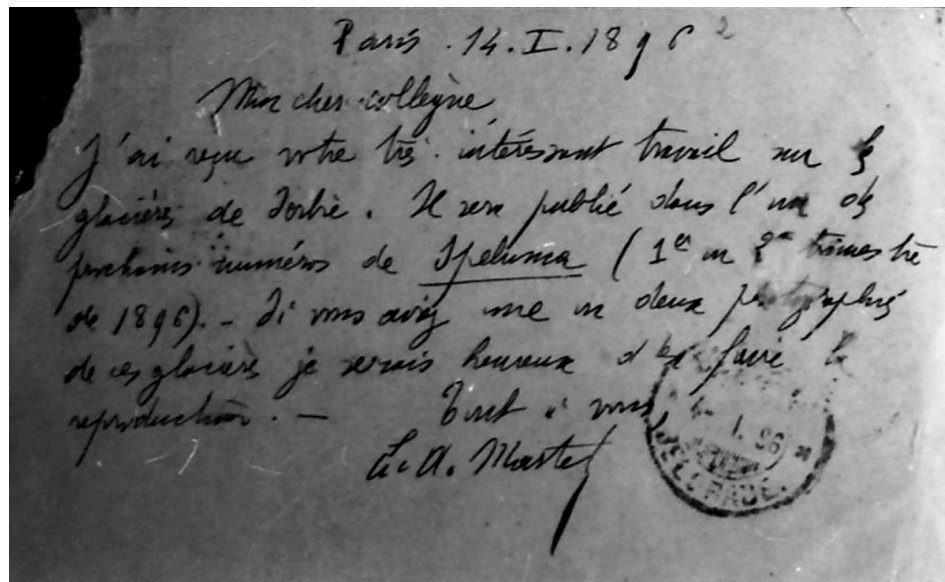


Fig. 1. Postcard from 14. January 1896

The next letter was dated to 19. December, 1924. In it Martel is informing Cvijić that he will be glad to meet him and talk about common subjects. The meeting was already scheduled for the next week in Paris, on the 23rd or the 24th of December. This means that Cvijić stayed in Paris or somewhere else in France during that time as they were able to meet on such a short notice.

Martel writes in the letter:

"Unfortunately, I will not be able to give you my book *Les Amibes*. It has been completely sold out a long time ago. Last year, in the catalog of one bookstore where the old books have been sold, I saw one copy at a price of 200 francs, which is absurd because that book (from 1894) is very obsolete and was imagined as some kind of an introduction. That really isn't any library attraction. I will show it to you, but in terms of the overall general results, that book has been replaced with my *Traité des eaux souterraines*, which I sent to you three years ago. I will also show you one new writing that will interest you."

The book that Martel mentions is *Nouveau traité des eaux souterraines* (1921). In the time that followed Martel has published work *Caussettes Gorges du Tarn*, and one shorter work *L'Aven Armand* (1927). It is also pos-

130841 1924-11
 E. A. MARTEL
 23, Rue d'Amale, 23
 PARIS-IX

Paris, le 19 décembre 1924

Cher Monsieur,

Avec grand plaisir, je recevrai votre visite pour causer un peu des questions qui nous intéressent tous les deux. Et puisque vous voulez bien vous dérangez, vous me trouverez, chez moi, 23, rue d'Amale, mardi ou mercredi prochains (23 ou 24 décembre) entre 17 et 18 heures.

Il me sera malheureusement impossible de vous offrir mon ouvrage sur "Les Abimes". Depuis très longtemps, il est complètement épuisé. L'année dernière, dans un catalogue de librairie d'occasions, j'en ai vu un exemplaire au prix de 200 frs., ce qui est absurde : car l'ouvrage (de 1894) est très vieille et était en somme préliminaire. Ce n'est vraiment plus une curiosité de bibliothèque. Je vous le ferai voir, mais au point de vue des résultats généraux, il a été remplacé par mon "Traité des Eaux souterraines" que je vous ai envoyé il y a 3 ans. Je vous montrerai aussi un nouveau document qui vous intéressera.

En attendant votre aimable visite, je vous prie d'accepter mes plus cordiales amitiés.

Er. A. Martel

130841 1924-6
 SOCIÉTÉ DE SPÉLÉOLOGIE
 7, Rue des Grands-Augustins
 PARIS
 Paris, le 6 août 1897

Mon cher collègue,
 Je vous envoie ci-joint un quitus de 50 francs
 J'ai bien reçu 4 de vos checks, et je
 vous prie de m'en adresser le prochain un
 sur de Spéologie.
 Bien sincèrement à vous,
 Er. A. Martel

Fig. 2. Letter from 06.08.1897

Fig. 3. Letter from 19.12.1924

sible that the new writing that Martel mentions is his new book in two tomes *La France ignorée* (Martel 1928–1930), which was written by March 1927 (Shaw, 1977–1978).

The fourth document is a postcard sent from Paris on 5. March, 1925. In it Martel informs Cvijić that they can meet on Tuesday or Wednesday, between 2 and 5 o'clock. Martel has prepared brochures for Cvijić which he has bought for him. He asks Cvijić for the exact day and hour because he already has some appointments, a lot of work, and is tired.

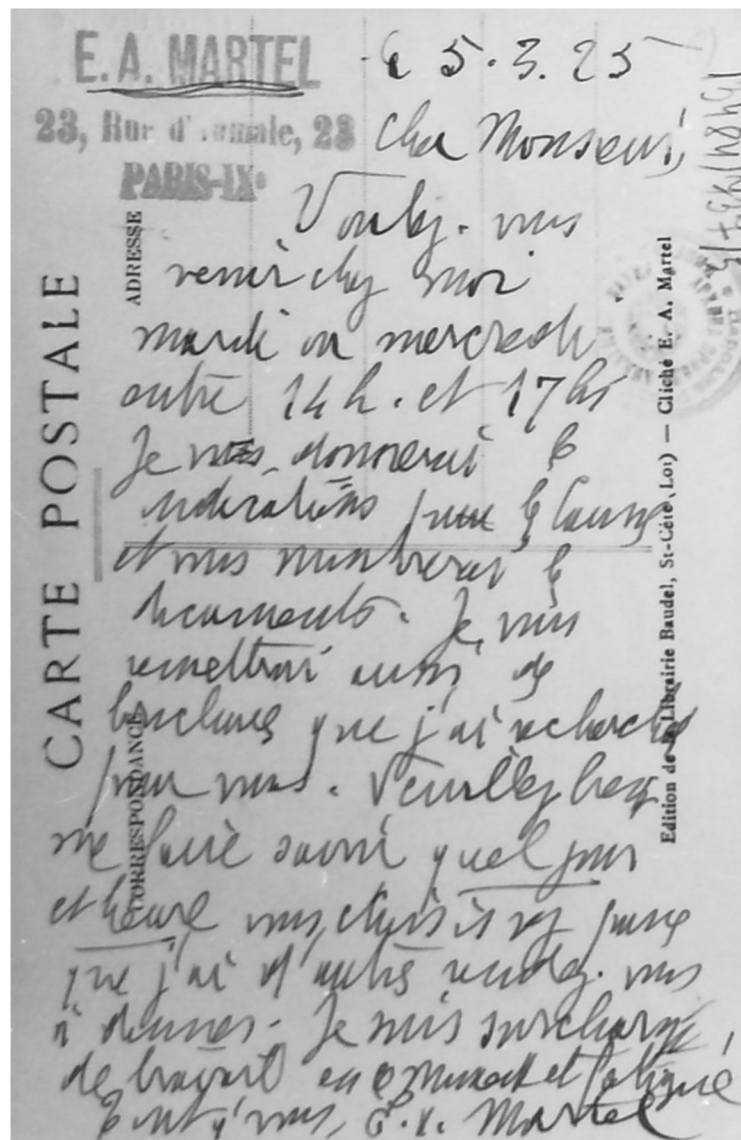


Fig. 4. Postcard
 from 5. Dec. 1925

According to the agreement about the meeting, it is clear that Cvijić is again somewhere in Paris or in France. About which brochures is it about, it could be said more after the access to Cvijić's library. On the postcard which Martel sent to Cvijić, next to the publisher, it can be seen that the photographer is (author of cliché) E. A. Martel. The identical postcard that shows Gouffre de Padirac, which Martel has studied and worked on the opening of this cave to the public, he has sent two years later to his publisher Librairie Delagrave (Shaw 1977–1978). The same postcards in such a long period probably show that Martel had them in stock perhaps because of the authorship of the photography.

CONCLUSIONS

Even though the correspondence which is available to us is modest, it still gives us a few conclusions:

Relations between Martel and Cvijić started from the beginning of the establishment of *Société de Spéléologie* (1895) and have lasted over 30 following years.

Correspondence from the two distant periods tells that there are probably more similar sources in the archive of The Academy, and probably in the archive of E. A. Martel.

Cvijić has visited Martel in Paris at least twice. During those occasions they shared the ideas and the brochure purchase for Cvijić in Martel's old age indicates that they were in friendly relation.

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JOVAN CVIJIĆ ON SCIENTIFIC WORK

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ABSTRACT: This paper presents and discusses Jovan Cvijić's views on science and, in particular, his methodology of scientific work and the ethics of science. The author argues that some of his methodological concepts were decades ahead of their time. One example is Cvijić's view on the scientific hypotheses, their temporary character and the benefit we have from refuting them. This is reminiscent of K. Popper's concept of refutability. The author also draws attention to Cvijić's emphasis on the importance of imagination in scientific work. In his view, it is equally important in both science and art. As far as Cvijić's views on ethics of science are concerned, the author specially points to the importance of work until exhaustion at the cost of health. This fits the tradition of neglecting the body in favor of spirituality. The difference is in the fact that, according to Cvijić, spirituality is replaced by science. Speaking about working incessantly, Cvijić says that it does not do any harm to the body, since the body is there to be used properly. This willingness to damage one's own body if so needed for work until exhaustion is highly suggestive of asceticism.

Keywords: Jovan Cvijić, science, methodology of scientific work, ethics of science

INTRODUCTION

There are scientists who, at one point of their career, stepped out of the field of their scientific occupations in order to make some observations about science itself or, for instance, about the methodological problems of natural sciences and humanities. Those insights are significant for philosophy of science, sociology of knowledge, psychology of science and some new approaches in science such as ethnographic research of scientific work.

At a commemorative lecture (Cvijić, 1907/1987) which was supposed to serve as a Rector's speech on Saint Sava's Day, Cvijić revealed many observations about science and methodology which were typical of the

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Western conception of science at the beginning of the twentieth century, but a few of them were far ahead of their time.

DECADES AHEAD OF HIS TIME

Unlike the most frequent cases which can be traced in most circumstances, where authors focus either on natural sciences or on humanities only, due to his work in the domains of natural sciences and humanities alike, Cvijić could present his thoughts on science and methodology of scientific work that refer to natural sciences and humanities (Cvijić, 1907/1987, 25). What these methods and processes of natural sciences and humanities have in common is the fact that both of them begin with “collecting and processing the material” (Cvijić, 1907/1987, 40). He also adds that this kind of scientific work can be done by all educated and hard working people, and that the material which they acquire may be used by other talented scientific workers to build the edifice of science. Cvijić does not hold the naïve belief that this edifice would be complete and finished, and would not need any further reconsiderations or changes: “No sooner than we organize and classify this material, can we notice weaknesses and voids in the general edifice of science” (Cvijić, 1907/1987, 40).

Relying on the aforementioned notion, Cvijić draws an analogy between untalented young workers who deal with collecting the material and mechanical work of craftsmen. Both of them are imprisoned in the narrow circle of their subjects (Cvijić, 1907/1987, 40). He says that those scientists do not notice even obvious connections and that in their scientific work “scarcely do they think in a scientific way” (Cvijić, 1907/1987, 40). It is clear that for Cvijić we can only talk about scientific work at the level of deep observations and making a hypothesis. Therefore, according to Cvijić, at the first level of the process of scientific work there are steady and incompetent scientific workers: while the first ones achieve long-lasting results the other ones make mistakes even at the stage of classifying the material. Therefore, the structure is made in such a way that needs to be modified or, in a worst case scenario, the process of classification needs to start all over again, as if nothing had been previously done.

Cvijić makes a distinction between the aforementioned level of scientific work and the other, higher level which begins with observations that contain explanations about observed facts and phenomena (1907/1987, 40). For him, these types of observations lead to hypotheses which often last for a short period and which do not need to be confirmed: “They do not

need to be tenable, but even when they are not tenable, we benefit from them" (Cvijić, 1907/1987, 40). In this citation we can see that Cvjić was aware of great benefit from refuted hypotheses in spreading of scientific knowledge. Later on, he says about hypotheses: "Scientific hypotheses which form important links in the development of science, flow like a river: some of them disappear, and others replace them" (Cvijić, 1907/1987, 45). Cvjić's quoted methodological remarks were not raised to the level of common principle until Karl Popper (1963). It was not until Popper and his school, which is sometimes called "critical rationalism", did refuting hypotheses become acknowledged as the key principle which distinguishes between scientific knowledge and metaphysics (Agassi, 2006).

Cvijić holds that even for these kinds of observations, which are more difficult and remarkable than those where the material is only systematically organized and classified, individuals who are not that gifted can be trained. He illustrates the difference between a talented and a less talented scientist with the following thought experiment: two scientists are observing the same phenomenon but unlike the first one who does not see anything special in it, the second one notices some of its special characteristics (Cvijić, 1907/1987, 40). He adds that based on some of these observations which impressed the person talented for science, and inspired him to think, the scientist recognizes the problem. Then, after due consideration, and sometimes very quickly, the scientist proposes a hypothetical solution in order to investigate and test if it correlates with other facts and phenomena, in the next step (Cvijić, 1907/1987, 41). It should be noted that, in his observations on methodological scientific work, Cvjić draws attention to the fact that the first step is the formulation of the problem, the second is making hypothesis and the third is its testing. The formulation which he uses when he speaks about the third step and which refers to the notion of hypothesis "is plausible among facts and phenomena" is reminiscent of the coherence theory of truth (Davidson, 1986).

However, Cvjić does not think that the whole scientific work follows the model of an observation, a problem, a hypothesis and its testing. He indicates that in the real processes of scientific creation such observations lead to conception of many ideas as well as a massive action plan which would be carried out for years with testing hypothesis (Cvijić, 1907/1987, 41).

He stresses that this process of creating theory is not a matter of intellect but it is mostly a matter of imagination. By this stance he is also ahead of his time.

No sooner than half a century later was the role of imagination emphasized in scientific work (C. Wright Mills, 1959). A long time before

that Cvijić emphasized that “the imagination makes the image of process, action, law” (1907/1987, 41). Therefore, some crucial elements of the categorial apparatus of science is actually provided by imagination. Furthermore, according to Cvijić, without imagination there cannot be “creative scientific work” at all (Cvijić, 1907/1987, 41). Cvijić’s thought on science is sophisticated: he does not say that there cannot be scientific work without imagination, but that there cannot be creative scientific work. It is clear that imagination is not essential at the level of scientific work, which Cvijić compares to that carried out by a craftsman. However, according to him, for those who deal with creative scientific work imagination has the same importance as it does for artists. By this surprising analogy between science and art, Cvijić anticipates certain quite radical trends in methodological thought in the second half of the twentieth century (Feyerabend, 1984).

Of course, in Cvijić’s case, there is no forced analogy to be applied in the realm of scientific work, where it does not belong. His comparison is appropriate and well used in the only sphere where we can talk about similitude between science and art: the sphere of imagination as the source of creative process in both forms of spirit. Unlike Cvijić’s view, Feyerabend’s thesis on the similarity between science and art is, in spite of its charm, to a great extent pretentious, unconvincing and forced.

Cvijić treats intuition as a separate characteristic of emotional life that differs from imagination. (He marks intuition with the disused word “slučenje”). He emphasizes that, alongside imagination it “also has a great influence on scientific work” (Cvijić, 1907/1987, 41). Cvijić is not alluding to conception that includes sensing – he also uses the expression “feel” – things which are about to happen in the future; but referring to ascertaining current phenomena, events and processes. Cvijić depicts this cognitive form in the following way: “There is not any definite and deep consideration, which would lead to an idea, but something can be felt, strongly felt, that in a certain direction we can find something with which the researcher is not unfamiliar” (Cvijić, 1907/1987, 41). In his view, he does not jump to the wrong conclusion that this sensing would lead to a discovery *ex nihilo*. On the contrary, in his depiction Cvijić incorporates consciousness suggesting that this phase of scientific work is related to the familiarity with the material. According to him, this heuristic moment “rarely leads us to the wrong conclusion” (Cvijić, 1907/1987, 41) and we should follow it. He considers that this circumstance supports the view that mere intellect is not enough in “recognizing and solving the scientific problems” (Cvijić, 1907/1987, 41). His contrast between recognition and solving the problem is reminiscent of categorial distinction which

appeared in philosophy of science later on as a difference between context of discovery and context of justification.

Cvijić calls this kind of creative work the incubation of “deep considerations and ideas” (Cvijić, 1907/1987, 41). For him, deep consideration is always the route that brings us ideas for solving scientific problems. That is why Cvijić analyzes them as methodologically separated in the aforementioned lecture while here he is representing them as united, that is to say in the way they should work in the process of scientific work: in mutual interaction. He emphasizes that there are hidden streams of emotions around intellect and subconscious lives that have great influence on the intellect.

He also adds a heuristic reference that almost has a universal value. Cvijić indicates that there are such scientific questions which are difficult to handle – he metaphorically depicts them as “hot potatoes” (p. 41). He recommends that we deal with them in the same way we approach the acknowledged conception for which the researchers know that they may be incorrect, but do not have better, alternative solutions. He suggests that, after the researchers have invested an amount of effort in those questions – sometimes even to exhaustion – they detach themselves from them. He indicates that those questions might appear later in the mind of the subject that deal with them. However, according to Cvijić, if the solution cannot be found, not only should we try approaching the problem from another perspective, including methods from the sciences that are investigating the same subject, but we should also include a new variable in the equation.

It is obvious that when this “new element” or “new observation” appears, it can lead to a new perspective that would reveal a new approach to the problem. However, it seems that, according to Cvijić, most important is a particular methodic skepticism, i.e. refraining from making any judgment until it is spontaneously formed. For him this process would be useful only if it is done using the right measures.

ETHICS OF SCIENTIFIC RESEARCH

Apart from those methodological insights, Cvijić’s observations concerning engaging the youth in science and ethics of scientific work are also of great value. They are often given in the form of advice to those who are about to step on to the road of scientific research. He emphasizes that when we engage the youth in science we should take into consideration the preferences of students, and then encourage their enthusiasm toward science. In the register of the humanities of the time, Cvijić calls it ideal-

ism (p. 43), claiming that it cannot be replaced by a substitute word. His view, which may be considered as the ethics of science, is that we should not gain any inappropriate support for our own scientific work by external factors that do not belong to science: personal contacts and influence. For him, this attitude, which should be passed on to students inconspicuously, actually means evaluating your work "by posthumous significance" (Cvijić, 1907/1987, 41). Those suggestions for others may actually serve as instructions for our own standards and behavior.

As one of the most important predispositions for scientific work Cvijić emphasizes the power of will. He relates it to the ability to endure thinking about scientific questions for extended periods, almost all the time, until the problem has been solved (p. 44). This will is opposed to any disturbance, impatience and impulsiveness (p. 43). Based on some formulations it seems that Cvijić's ethics of science sometimes tends towards work until exhaustion at the cost of health. It seems that at those moments the tradition of neglecting the body in favor of spirituality emerges, where spirituality is replaced by science. Speaking about working incessantly, Cvijić says: "It mostly does not do any harm to the organism, and if it does, the organism is there to be used properly for a good cause" (p. 44). This willingness to damage your organism if so needed, that is to say "to use it properly" for a higher cause, is highly reminiscent of asceticism.

Cvijić also gives consideration to the phenomenon of yearning for status, scientific success and the phenomenon of self-promotion – everything that a special discipline would be focused on decades later: the sociology of intellectuals. As for the yearning of status, Cvijić relates it to the striving of young scientists for better working conditions. Cvijić defines this striving as selfish in traditional opposition: selfish – ethical. We may question if the aspirations of young scientists could be shown in a better light provided we differentiate between personal interest and selfishness (Prnjat, 2012, 342). However, the fact that Cvijić used the traditional distinction between selfish and ethical motives, and selfish and ethical motivation, is evident: "Those selfish motives are interwoven with ethics and it is often difficult to make out which one prevails" (p. 44). Nevertheless, Cvijić claims that real scientists later abandon selfish aspirations for searching for truth and the will to solve a scientific problem. As well as a preference for rapid success in science, Cvijić differentiates between a case when success has come unexpectedly, after the first works, and a case when success becomes a motivational force. He emphasizes that the second striving is not desirable and that it sometimes can completely "destroy the credibility of the scientist" (p. 44). This reference to the ethics of the scientific work can be applied at any moment, and in the

current philosophy of science attention has been drawn to the fact that scientific credibility has been undermined to such an extent that some results of experimental work were plagiarized. Cvijić defines the phenomenon of self-promotion and narcissism as “the cult of the self” (p. 44). In his opinion, this overestimation of the self has the most serious and the most destructive consequences upon scientific work. He thinks that this self-worship is the characteristic of untalented scientific workers, but it can be related to the way one was brought up, or to the mere willingness to follow such examples in science (p. 44). In some movements in philosophy and culture at the time, this overestimation of the self was inspired by the wrong interpretations of Nietzsche’s figure of the Overman. Cvijić distinguishes between this and the moments when scientists whom he considers real scientists, and who acknowledge strong criticism of their attitudes, sometimes feel satisfaction with their scientific work. Cvijić believes that not only do those moments give moral strength, but they also give physical strength to the scientist.

As an antidote to inappropriate fascination by our scientific results and scientific magnitude, Cvijić suggests bearing in mind the circumstances; that everybody in science relies on the results of their predecessors. He conjures the famous image of climbing the shoulders of giants, which can be traced from Neo-Platonists in Middle Ages Bernardus Carnotensis to Sir Isaac Newton, and which in Cvijić’s formulation is: “Each one of us climbs to the shoulders of the other one” (p. 45). That metaphor has become the most common image of spreading scientific knowledge, as it can be found on the first page of the most famous browser of world scientific bibliography “Google Scholar”. In order to avoid the inappropriate estimation of our work, Cvijić also recommends taking into consideration the fact that some results have come about by mere chance. He also advises thinking about everything that other scientists can achieve, while we cannot. All of those pieces of advice have a moral subtext, and they belong to the ethics of the scientific work.

CONCLUSION

From all we have mentioned above, not only can we discern characteristics of Cvijić’s ethics of scientific work, and a particular asceticism, but we can detect the fact that, with a few methodological observations, he anticipated methodological discussions which were about to happen decades later. However, we need to emphasize that Cvijić’s remarks are sometimes more appropriate.

ACKNOWLEDGEMENTS: This paper is a part of the project 43007, grant of Ministry of Education, Science and Technological Development of the Republic of Serbia.

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JOVAN CVIJIĆ AND THE SERBIAN GEOGRAPHICAL SOCIETY

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The founding of the Serbian Geographical Society on the Annunciation Day in 1910 was an important and joyful event for Cvijić.

Pavle Vujević

Great scholarly achievements that came as a result of Cvijić's activities, young professionals, few but well-trained under the leadership of Cvijić, and considerable reputation earned through Cvijić's public work, were favourable signs for the development of a new scholarly association.

Borivoje Ž. Milojević

ABSTRACT: After many years of preparation, the Serbian Geographical Society was established at the Ceremonial Hall of the Rectorate of the University of Belgrade on April 7, 1910, as the first association of its kind in the Balkan Peninsula. The first regular meeting of the Serbian Geographical Society was held on April 29, 1910. Jovan Cvijić, the first geographer educated according to modern standards, who was at that time a professor at the University of Belgrade, a full member of the Serbian Royal Academy and a scholar of a European and global reputation deserved the most of the credit for the establishment of the Serbian Geographical Society. At the founding meeting, the management bodies of the Serbian Geographical Society were elected, the Rules of Procedure were adopted and the publishing of the Bulletin of the Serbian Geographical Society, the oldest geographical periodical in the Balkans, was initiated. Jovan Cvijić was the head of the Serbian Geographical Society between 1912 and 1927. The Serbian Geographical Society has been active to date, with interruptions during the two world wars. It brings together scholars, university professors and high school teachers, has scientific and education sections and extensive publishing output. The Serbian Geographical Society is seated in Belgrade.

Key words: Serbian Geographical Society, 1910, Jovan Cvijić, Bulletin of the Serbian Geographical Society, Belgrade

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INTRODUCTION

Having completed the studies of geography at the Great School in Belgrade, Jovan Cvijić (1865–1927) decided to continue his professional development in Vienna. He spent three years in the city of science, culture and rich libraries, to defend his PhD thesis late in 1892 and early in 1893. As a twenty-seven-year-old geographer educated according to modern standards and a holder of a PhD degree, he returned in Serbia in March 1893. Very soon, he was appointed a full professor of Physical Geography and Ethnology at the Great School. He also established the Institute of Geography, the predecessor of the Faculty of Geography of the University of Belgrade. Along with regular lecturing, conducting specifically designed field research in mountainous regions of Serbia and the Balkan Peninsula, and presenting research results at the Seminar, he also selected associates, lectured in Serbia and abroad, published scholarly papers and wrote guidelines for the study of rural settlements, origins of the population and its psycho-physical characteristics.

As a person who was well familiar the life and work of Jovan Cvijić, Academician Vasa Čubrilović (1897–1990), who knew Cvijić personally, who occasionally cooperated with him and who reported at Cvijić's Seminar, states that the "scholarly, working atmosphere that emanated from the Institute of Geography in Cvijić's times was very favourable for the development of scientific and technical personnel at universities everywhere, including our country. Seen from this standpoint, it is understandable that teaching assistants and students had to be pulled into the research activities of the Department of Geography at its Institute of Geography. Naturally, their duties could have had different forms. As for scientific research, plans, programmes and scientific tasks, it is understandable that Cvijić defined them in accordance with his beliefs and problems related to his work. In scholarly communities of that kind this is inevitable. Through that process, junior associates were developing and building up themselves as teachers and scholars. Cvijić's method of developing scholars was shaped according to the model of universities in Western and Central Europe (Čubrilović, 1987). It was upon these foundations that Jovan Cvijić undertook to establish the Serbian Geographical Society because he had a good insight into the activities of the Geographical Society in Berlin (Gesellschaft für Erdkunde) and the Geographical Society in Vienna (Kaiserlich-königliche geographische Gesellschaft).

On this occasion, we would like to highlight the role of Jovan Cvijić in the founding and operation of the Serbian Geographical Society, the

oldest association of this type in the Balkan Peninsula which is, even today, distinguished by its numerous activities, and especially by its extensive publishing output, by field seminars, scholarly and professional conferences, by the event The Days of Jovan Cvijić and competitions for primary school children. The foundations laid in 1910 by Jovan Cvijić are largely maintained even today, under new circumstances and the new political and social system.

JOVAN CVIJIĆ AND HIS CONTACTS WITH THE GEOGRAPHICAL SOCIETIES OF BERLIN AND VIENNA

The founding of the University of Belgrade, which had grown from the Great School, had a particular importance for the development of geography in Serbia and the Balkan Peninsula, and, consequently, for the establishment and operation of the Serbian Geographical Society. This happened in 1905. The following year, Jovan Cvijić succeeded the chemist Sima Lozanić (1847–1935) as the Rector of the University in the Serbian capital and he profoundly contributed to the improvement of this university institution and particularly to the development of the Institute of Geography, which he himself had founded in 1893. During a visit to Belgrade, Albrecht Penck (1858–1945), Cvijić's PhD tutor in Vienna and subsequently a good friend, said that even the great capitals of Europe would have been proud of such an institute.

The Institute of Geography was strengthened in terms of staff. It was with unflinching perspicacity that Jovan Cvijić selected his young associates. Before all, they included the geographers Jefto Dedijer (1879–1918), Pavle Vujević (1881–1966), Borivoje Ž. Milojević (1885–1967), Rista Nikolić (1877–1917), Petar Janković (1874–1909) and Vasilije Ruvarac, the land surveyor Stevan Bošković (1868–1957), the biologist Nedeljko Košanin (1874–1934), the ethnologists Tihomir Đorđević (1868–1944) and Jovan Erdeljanović (1874–1944), the historian Stanoje Stanojević (1874–1937), the physician and anthropologist Milorad Dragić (1891–1986), etc.

The success would have been much greater if Jovan Cvijić had had better luck with his staff. "Some of his good associates and good scientists died early. Others were killed in the wars between 1912 and 1918. When I was his student, Cvijić recounted with sadness that he had used to have twelve good scholars, associates, and that not many of them survived. All of them either died or were killed in wars. After such conversations, I would often think about that and it sometimes occurred to me that he exaggerat-

ed a little bit. But long after his death, when I once asked his cartographer Antonije Lazić about that, he seriously replied that Cvijić had told the truth. And he listed all of Cvijić's twelve associates who, until 1920, either died or were killed in wars. By training and gathering around himself new scholarly staff, Cvijić laid the foundations of the so-called Cvijić's school of geography." (Čubrilović, 1987). A significant part of actions related to geographical science and education were carried out under the auspices of the Serbian Geographical Society and especially through its publications, which are still cited.

For Jovan Cvijić, field research was the fundamental basis for the study of geographic, geological and anthropogeographic phenomena, processes and structures. Through his personal example, by spending almost three months a year doing research in field settings, he sought to influence others. He paid great attention to the Seminar as a specific type of organizing work with junior researchers, i.e. to reporting on research results, which were then recommended for publishing if they happened to meet strict criteria. Along with the existing journals, new ones emerged. The cooperation with international geographical institutions was excellent. Jovan Cvijić and his associates published a number of papers in European journals; they were guest lecturers at international universities and they presented their results at international conferences.

It seems that an important role in the founding of the Serbian Geographical Society, after lengthy and thorough preparations, was played by Jovan Cvijić's visit to Berlin, where he got acquainted with the organization and activities of their Geographical Society and where he also delivered the lecture titled *Forschungsreisen auf der Balkan-Halbinsel* (Research Trips in the Balkan Peninsula) on February 8, 1902. The lecture was published in the journal *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* (Journal of the Geographical Institute in Berlin), pp. 196–213. The year of 1907 was even more important. That year, "the Geographical Society in Vienna organized a meeting during which Cvijić delivered a successful lecture on the origin of Đerdap (Iron Gate). This was on October 28. The meeting was attended by all members of that Society, all professors and assistant professors of geography and geology, a large number of students from Slavic countries and Austria, a military general, famous scholars, such as Uhlich, Brückner, Schäfer, Leiter, as well as the President of the Austrian Academy of Sciences and Cvijić's former professor, Eduard Suess. Participants in the lively discussion that followed the lecture included professors Uhlich, Hasert and Brückner, who were well acquainted with the geomorphological problems in Balkan countries. Cvijić successfully defended his

views and conclusions related to the origin and formation of the longest gorge in Europe." (Vasović, 1994). It is possible that the mentioned visit to the Geographical Society in Vienna was the decisive impetus for the founding of a similar institution in Belgrade, i.e. for the establishment of the Serbian Geographical Society.

THE YEARS OF PREPARATION FOR THE ESTABLISHMENT OF THE SERBIAN GEOGRAPHICAL SOCIETY

Preparations for the establishment of the Serbian Geographical Society lasted for years and they were extensive and wide-ranging. The Rules of Procedure of the future Society were drafted in 1905. Almost all actions were directed by Jovan Cvijić. However, he did not attribute credits to himself, but stated that it was with great trepidation that he undertook the establishment of the society and "if the Geographical Society managed to stand on solid feet and gain its true significance, the main credit should go to the young and very young forces in geography and natural sciences who have been encouraging me over the past several years to undertake this task."

Along with Jefto Dedijer, Pavle Vujević and Borivoje Ž. Milojević, a prominent place among the young associates who were of great help to him in the 1900s, as well as after the founding assembly of the Serbian Geographical Society, was occupied by Stevan Bošković, the Head of the Geographical Department of the General Staff of the Army of Serbia; Rista Nikolić, a secondary school geography teacher who authored papers in several geographical disciplines; Sava Antonović, a grammar school director; Jovan Erdeljanović, a famous ethnologist; Nedeljko Košanin, a famous biologist, Vladimir Petković, a university professor of geology; Vasilije Rucarac, a clerk at the National Bank, and Stanoje Stanojević, a professor of the University of Belgrade and others.

As a man who was exceptionally well familiar with local temperaments and the ability of his compatriots to work together, Jovan Cvijić was unable to identify a single institution in Serbia where joint efforts resulted in a significant success. He feared the fierceness and arguments among individuals which mainly arose from personal motives, though many cited principles and objective reasons as the pretext for such behavior. "I believe," Jovan Cvijić wrote, "that such things are non-viable in our Society. In order to achieve true success, it is necessary that each member of the Geographical Society has a feeling and awareness that he is obliged to do

something for his Society and that every social function, no matter how insignificant it may look, is a part of a system and society-building efforts – therefore it is an important labour that should be undertaken with understanding and love. Let our abilities develop in this constructive direction and not along destructive and individualistic lines.” (Cvijić, 1912). The great scholar warned his associates to beware of superficiality in their work. The Serbian Geographical Society, which presented its programme to the general public and sought to establish contacts with various institutions, was to be at the forefront of work.

THE FOUNDING ASSEMBLY OF THE SERBIAN GEOGRAPHICAL SOCIETY

Jovan Cvijić and his associates founded the Serbian Geographical Society on the day of Annunciation, on April 7, 1910. The founding assembly was organized in the Ceremonial Hall of the Rectorate of the University of Belgrade, in the mansion erected by Miša Anastasijević (1803–1885) at the Great Market, i.e. today’s Studentski Trg (Students’ Square) No. 1 in Belgrade.

The words of Jovan Cvijić at the founding assembly of the Serbian Geographical Society were published in the first issue of the Bulletin of the Serbian Geographical Society, which was presented to readers in March 1912: “The geographical centre at the University has strengthened; we have a significant number of experts in geography in Serbia and other Yugoslav lands; there is an even greater number of intellectuals who are interested in geographical and anthropogeographical research; the results of previous work have become so diversified that one can clearly see not only the full scope and significance of our science, but also fruitful contacts between geography and other sciences – geology, climatology, phytogeography, ethnography in particular; it seems that our audience is also aware of the relevance of geographical studies for national, economic and national issues.”

Having clearly and expressly, in no more than a few sentences, highlighted the situation in the country and the importance of geographical research, Jovan Cvijić emphasized the meaningful creative relationships between geography and related sciences. He was one of the first scholars in this part of the world to insist on the still topical processes of interdisciplinarity and multidisciplinary. In this respect, he stated: “In the letter in which the participants are invited to the first meeting, the reasons

are stated which, as it seems, have enabled us to successfully establish a scholarly society dealing with geography and related sciences... The call for the establishment of the Geographical Society has been responded not only by all geographers and many other experts in related sciences from Belgrade, but also a considerable number of experts from Serbia came to the first meeting. In addition, responses have been received from other countries which suggest that we are not wrong: other experts, too, believe that Belgrade deserves to be the place where the first geographical society in the Balkan Peninsula will be founded." (Cvijić, 1912).

At the founding assembly of the Serbian Geographical Society the Rules of Procedure were adopted. In a brief speech, Jovan Cvijić, defined the future tasks of the newly established association, which were related to the scientific and professional work, as well as to the popularization of knowledge of geography and related sciences. The Management Board of the Serbian Geographical Society was elected. Jovan Cvijić was elected as the President and he remained at that position until his death in 1927. Lieutenant Colonel Stevan Bošković, who was at that time the Head of the Geographical Department of the General Staff of the Army of Serbia, was elected as the Vice-President of the Society. Rista T. Nikolić, at that time a secondary school geography teacher, was appointed a treasurer, while Pavle Vujević, an assistant professor at the University of Belgrade, was elected as the Secretary. Sava Antonović, a grammar school director; the ethnologist Jovan Erdeljanović, an assistant professor at the University of Belgrade; the biologist Nedeljko Košanin, an assistant professor at the University of Belgrade; Vasilije Ruvarac, a clerk at the National Bank of Serbia, and the historian Stanoje Stanojević, a professor at the University of Belgrade, were elected as the members of the first Management Board. Jovan Cvijić, Pavle Vujević and Milorad Dragić were elected as the members of the Editorial Board of the Bulletin, the first journal of its type in Serbia and the Balkan Peninsula.

The first working meeting of the Serbian Geographical Society was held on April 29, 1910. The attendees were addressed by Jovan Cvijić, who reported on lakes in South Macedonia and climatic variations, and Stanoje Stanojević, who talked about the tasks of historical geography. Two weeks later, the second working meeting featured lectures by Nedeljko Košanin (on biogeographical conditions in the northern areas of the Balkan Peninsula) and Vladimir Petković (on the tectonics of the Belgrade area).

The illness, the Balkan wars, World War I, frequent travel, the suspicion on the part of the Austro-Hungarian authorities, the dangers that accompanied travelling through Kosovo and Metohija, stays abroad and

other events either hindered or completely disrupted the activities of the Serbian Geographical Society at the very beginning of its operation. Jovan Cvijić was a contemporary of the Serbian Geographical Society for only seventeen years and he occupied the position of its President throughout that period, during which there were seven years of war that in many ways impaired Serbia, which, among other things, lost one third of its population. Despite the circumstances, the foundations for the first geographical scholarly and professional association in Serbia and the Balkans that were laid by Jovan Cvijić, who also made it known and recognized in a broader European context, are still deeply respected.

The credit for the successful work of the Serbian Geographical Society in the years immediately following its establishment, regardless of objective difficulties, goes to numerous members and institutional benefactors. Their financial support made possible the printing of publications and organization of conferences. The benefactor members included: the Fund of Vladimir Karić, the author of the book *Srbija – opis zemlje, naroda i države* (Serbia – A Description of the Land, People and Government); the lawyer and diplomat Jovan Mišković, the Minister of Defence; Marko Dobrojević, a merchant; Luka Čelić, the head of the Belgrade Cooperative; Manojlo Klidis, an industrialist; Ljubomir Krsmanović, a renter; Svetozar Matić, an engineer; the secondary school teachers Petar Janković, Radoje Dedinac and Cvetko Petković; the physicians Mihajlo Dragić and Radivoj Simonović; Dimitrije Bojadžijević, a merchant; Professor Živojin Jurišić and Vladislav Santber; Đorđe Vajfert (Weifert), the Governor of the National Bank; Nikodim Vasić, a clerk at the National Bank and others.

The collaboration between the Serbian Geographical Society and international scholars was intense and wide-ranging. The most famous among them were awarded appropriate honours. In 1911, Prince Ronald Bonaparte, the President of the Geographical Society of Paris (*Société de Géographie*), was elected as the first honorary member of the Serbian Geographical Society. Two years later, the honorary membership was awarded to the eminent scholars Eduard Suess, Konstantin Jireček, Alfred Philippson and Julius von Hann, all based in Vienna, as well as to Aleksandr Ivanovich Voieikov (Александр Иванович Воейков) from Saint Petersburg; Albrecht Penck from Berlin, Emmanuel de Margerie from Paris and Archibald Geikie from Haslemere. Since that time until the present day, fifty-four scholars have been elected as honorary members of the Serbian Geographical Society. Over time, forty distinguished scholars were elected as its corresponding members. The Medal of Jovan Cvijić, which was established in 1935, was awarded to sixty-two individuals from Serbia and foreign countries and fifteen scholarly institutions.

At the initiative of Jovan Cvijić, in 1922, a department of the Geographical Society was established in Skopje. An especially important role in its founding was played by Cvijić's associates, who would later become Academy members – the ethnologist Sima Trojanović (1862–1935), the geographers Petar S. Jovanović (1893–1957), Vojislav S. Radovanović (1894–1957) and Atanasije Urošević (1898–1992). Along with other activities, between January 15, 1922, and January 20, 1935, the Department of the Geographical Society in Skopje organized 31 lectures for its members.

On October 25, 1924, at the proposal of Jovan Cvijić, the Serbian Geographical Society established a speleological section, which was subsequently renamed as the Department for the Study of Caves and Karst. It seems that by establishing the department Jovan Cvijić returned to his primary scholarly interest – the study of karst in all of its peculiarities. For a while, there was also the Department for the Study of the Livestock Farmers' Life in Our Mountains, which was later renamed as the Department of Economic and Political Geography. Its establishment had to do with to a part of the conclusions of the First Congress of Slavic Geographers and Ethnographers, held in Prague in 1924, where accent was laid on the study of livestock farmers' life and migrations in the Carpathians and the mountains of the Balkan Peninsula. In this regard, the Serbian Geographical Society went even further because it took into consideration the significance of our mountains for human life, as well as for the economic and political situation (Milojević, 1935).

Upon establishment, the Serbian Geographical Society had one hundred full and extraordinary members. Ten years later, there were 144 members, whereas in 1922, the membership reached 319. In 1990, there were 680 full and 125 extraordinary members. Today, the membership has increased to 800 full and 240 extraordinary members. The anniversaries of the Serbian Geographical Society were celebrated in 1935, 1960, 1970, 1975, 1980, 1985, 1990 and 2010.

FUNDAMENTAL RESEARCH PRINCIPLES IN GEOGRAPHY AND RELATED SCIENCES

Jovan Cvijić's speech at the founding assembly of the Serbian Geographical Society was published in the first issue of the Bulletin, issued in March 1912. This publication bears a series of specific traits which have made it unique. In it, Jovan Cvijić defined the tasks of the newly founded association and outlined several issues for further geographical research, publication

of studies and popularization of geographical science. He dedicated special attention to scholarly and professional work, which, according to him, must be long-standing and major tasks. He planned to organize meetings at which scientific and technical issues would be discussed, the methods of scientific work in geography and related disciplines would be learned, new concepts would be adopted and scientific problems to be dealt with would be identified. "The refinement and improvement of geomorphological research methods should be an important task at conferences. Anthropogeography is also in full development, and within this discipline, geographic influences and geographical methods, which give the most productive and the most accurate results should be even more strongly emphasized; among many anthropogeographers and ethnographers, this last issue has not substantially become part of the scholarly consciousness. Apart from the two areas of study, other geographical disciplines have made a progress in recent decades like no other science." (Cvijić, 1912).

The founder of Serbian Geographical Society further draws attention to the importance of boundary research areas of geography and related sciences, because numerous issues fall into these fields. Accordingly, he concludes that the "Geographical Society should particularly foster the contacts with neighboring sciences, while selecting those of their results that are relevant for geography. Furthermore, there will be a tendency to pass the fertile geographical method into common use in Earth-related sciences and those whose subject is Earth-related." (Cvijić, 1912).

The year of 1924, when, on October 18, the Geographical Society and the Institute of Geography, organized a conference to commemorate thirty-five years of Jovan Cvijić's scholarly work, bears particular importance. The subtitle of the proceedings dedicated to the founder of the Serbian Geographical Society highlights words by his friends and associates. The large-format book has 646 pages. The foreword is authored by the then Rector of the University of Belgrade, Pavle Popović (1868–1939) and Cvijić's associates Pavle Vujević (Geographical Society) and Borivoje Ž. Milojević (Institute of Geography, University of Belgrade). The book features twenty-one papers by international authors and fifteen papers by local scholars. It was, and has remained, a kind of a gift to Jovan Cvijić and the Serbian Geographical Society.

As he fully understood the world and reality around him, and particularly the importance of science, culture and education, Jovan Cvijić emphasized that in order to enable the fruitful functioning of the Serbian Geographical Society, it was necessary to involve a large number of trained researchers in the area of geography and related sciences, capable

to conduct research in field settings, as well as at the table. He set such objectives as the second task of the Serbian Geographical Society, no less important than the first task – scholarly work. He insisted on attracting active and tireless people who would work in the sections of the Serbian Geographical Society. Cvijić concludes: “Another task of the Geographical Society is the popularization of geographical knowledge and extending connections to a wider circle of amateurs, who are defined as extraordinary members by the Rules of Procedure. This work requires the most willing, active and tireless members. We mainly had them in mind when we foresaw in the Rules of Procedure the establishment of sections of the Geographical Society both in Serbia and outside of it. There are certain facts that these sections will successfully establish in their respective areas relying on guidelines, which are to be drafted. The sections will particularly nurture tourism geography, ethnology, and simple anthropogeographical and phytogeographical research. By instituting extraordinary membership and sections, the Geographical Society would transcend the narrow professional circle and gain a deeper significance. This would also enable its financial strengthening.” (Cvijić, 1912).

THE BULLETIN – THE FIRST PUBLICATION OF THE SERBIAN GEOGRAPHICAL SOCIETY

Jovan Cvijić dedicated a part of his speech at the founding meeting of the Serbian Geographical Society to the Bulletin, the main publication of the Society, which was to be published in two issues a year. Special responsibility for it was to be borne by the President of the Society, who was to ensure financial support from the Ministry of Education and benefactors, from whose contributions only the interest was to be spent. As Cvijić pointed out, the Bulletin was to publish research results related to various structures, phenomena and processes in Serbia and the Balkan Peninsula, if they were of interest for geography and related sciences. Special attention was to be paid to those studies which clearly, briefly and exactly, based on multiple observations, discussed a scientific concept or presented the results of several detailed studies, regardless of whether they had been previously published elsewhere. In addition, the Bulletin would also publish various original geographical research materials on individual mountains and regional units, notes on karst forms and manifestations, lakes, floods, as well as contributions related to anthropogeography, ethnology, statistics, technical terminology and reviews of scholarly and technical papers.

The Bulletin of the Serbian Geographical Society, whose editor between 1912 and 1927 was Jovan Cvijić, was first published in two issues a year with interruptions during World War I and World War II; recently, it has been published in four issues a year. As the editor of the Bulletin, Jovan Cvijić was particularly active in choosing topics and attracting good collaborators, compiling bibliographies, writing reviews and critical reviews in the journal" (Čubrilović, 1987). During Jovan Cvijić's lifetime, four issues of the Bulletin were published between 1912 and 1914, whereas between 1920 and 1927, another eight issues were released.

In 1961, Borivoje Ž. Milojević, published the paper *O radu i životu Srpskog geografskog društva u vremenu od 1910–1960. godine* (The Work and Life of the Serbian Geographical Society from 1910 to 1960). He highlighted the significance of Cvijić's studies of the Balkan Peninsula and stated that "...some of the areas of Cvijić's activity found an echo outside the narrow circle of specialists. Educated people who lived among common people took an interest in collecting data about inhabited places and origins of population, just like general public took an interest in certain geographical and ethnographical studies due to the fact that Cvijić was involved in public life, contributing to publications dealing with such contemporary events as the Macedonians' struggle for liberation from Turkish rule, the annexation of Bosnia and Herzegovina and the emigration of the Muslim population from these lands." (Milojević, 1961). All these actions, as well as several young people, researchers and university professors that were well trained under the guidance of Jovan Cvijić "...were favourable signs for the development of a new scholarly association. It immediately started to work and, with certain interruptions, has continued its activities until today. However, the fact that in the life of our Society, as well as in our lives in general, we may distinguish three periods, divided by two world wars, in the past half century reveals that the links between some events within the period were strong." (Milojević, 1961).

The achievements of the Serbian Geographical Society would have been even greater and more significant if our country had not so much and so often been affected by wars. Only two years after its establishment, the First Balkan War began and it proceeded into the Second Balkan War. World War I lasted from 1914 to 1919 and it inflicted irreparable losses to Serbia in numerous areas of life and work. World War II lasted from 1941 to 1945. The Serbian Geographical Society was not active during the two world wars. In the bombing of Belgrade during the two great wars, almost entire documentation and property of the Serbian Geographical Society disappeared. The Society was first revived in 1919 and then, for a second time, in 1946.

According to Borivoje Ž. Milojević, the Serbian Geographical Society was renamed in 1919 as the Geographical Society at the proposal of Jovan Cvijić, but its objectives remained the same. It is particularly important to point out that the Education Department was established and that geography teaching in secondary schools and the university was discussed at several sessions.

CVIJIĆ'S STUDIES IN PUBLICATIONS OF SGS

Jovan Cvijić carefully selected journals in which he published his papers. The Bulletin of the Serbian Geographical Society was available to him between 1912 and 1927. Some of the years that fall within this period coincide with the First Balkan War, the Second Balkan War and World War I, when Jovan Cvijić performed various duties, travelled and lived abroad, held lectures at the Sorbonne in Paris, but was also tossing with the idea of retiring to the monastery of Studenica, where he could work on his manuscripts in peace, if there was any peace (Čubrilović, 1987).

The studies by Jovan Cvijić published in the Bulletin deal with geomorphology, geography of karst terrains, speleology, anthropogeography, limnology, glaciology and regional geography. Due to their extraordinary importance, some of the studies were posthumously reprinted in the editions of the Serbian Geographical Society and publications of other publishers. Thanks to this, they became available to a wider circle of readers. "In the mentioned issues of the Bulletin, Cvijić, on the one hand, presents a summarized overview of the results of his explorations of the glacier relief of the Prokletije, while on the other, motivated by the desire to make people understand correctly the events related to the Balkan Wars, publishes articles about the importance of gaining access to the Adriatic Sea for Serbia, a new geographical and cultural position of Serbia and the distribution of the Balkan peoples. Cvijić's disciples work along the same two lines of interest: studies of geomorphological character include a brief paper on the glacial relief of the Šara and Korab mountains, as well as articles on the relief of the Pljevlja and Svrlijig valleys, while anthropogeographic studies include papers about the expansion of the Albanians in Serbian lands, livestock breeding zones in the mountains of the Dinaric system, settlements in Šumadija, population density in Serbia and the economic and geographical conditions and settlements in Dalmatia. A significant addition to these works of Cvijić's school is the study on the impact of the surrounding seas on the temperature conditions in the Balkan Peninsula,"

writes Borivoje Ž. Milojević, highlighting the breadth and complexity of the Bulletin's contents.

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GEOMORPHOLOGY AND GEOLOGY



KARSTIC UVALA: EVOLUTION OF THE TERM – FROM THE TIME OF CVIJIĆ TO NOWADAYS

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ABSTRACT: Closed karst depressions, as dominant forms of karst surface morphology, were first scientifically studied by Jovan Cvijić, who gave their initial systematic classification. While dolines and poljes were elaborated and defined in his dissertation in 1893, it was not until the years 1900 and 1901 that he introduced the definition and more detailed analysis of karstic uvalas. In these papers, Cvijić included the uvalas into the concept of cyclic evolution of karst depressions (doline – uvala – polje). As a consequence of the following abandoning of this concept in karst development, the uvala started to lose its status of a particular form of karst surface relief. This has been especially the case in the anglo-saxon literature in the second part of the 20th century, when most karstological references in English language used either vague definitions of uvalas (related to size and not genesis or development) or did not list the uvalas in surface depression classifications at all. New detailed studies, at the beginning of the 21st century, are directed to efforts for keeping the status of uvalas as particular forms of karst surface relief, through their re-definition and complex approach. The main tendencies in the studies of uvalas are analysed, and terminological issues discussed.

Key words: karst, uvala, closed depressions, terminology, Jovan Cvijić

INTRODUCTION

Scientific discipline which covers various aspects of karst research is called karstology. Although the origin of the term is relatively recent, the real beginning of the scientific research of karst dates back to the 19th century. In one of the most cited karstological references, Ford & Williams (1989, 2007) state that the true development of karstology started with the work

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of Jovan Cvijić: "His 1893 exposition, *Das Karstphänomen*, laid the foundation of modern ideas in karst geomorphology, ranging over landforms of every scale from karren to poljes" (Ford & Williams, 2007, 6).

In its segment related to karst geomorphology, karstology boosts with rich and very specific terminology, originating mostly from South Slavic languages, which is again one of the prominent contributions of Jovan Cvijić's studies on the area of the Dinaric karst. However, during more than a century long evolution of karst terminology, some of the terms have undergone changes in their definitions, clarity and significance. Regarding the fact that, apart from the subject and methodology, a scientific discipline needs to have semantically clear and broadly accepted terminology, the discussions on karstological terminology are needed in order to solve the vague points and changes over time.

Usually accepted classifications of closed depressions on karst surfaces include dolines, uvalas and poljes. Major references in English language often omit the uvalas from this classification. The aim of this paper is to review the role of Cvijić in terminology of karst surface depressions, with particular attention to uvalas.

CVIJIĆ'S TERMINOLOGICAL CONTRIBUTIONS ON KARST SURFACE DEPRESSIONS

The first scientific elaboration of dolines was given by Cvijić in his doctoral thesis (1893, 1895). In many overview references (e.g. Sweeting 1972, Ford & Williams 1989, 2007; and many others) it is stressed that Cvijić's main classification of dolines is only morphographic (bowl-shaped, funnel-shaped and well-shaped dolines). However, it must be said that this is only his sub-classification of "normal", solutional dolines. The initial Cvijić's classification, which is somehow "hidden" because of unsystematic organization of the chapters, distinguishes: (1) "normal" dolines (equivalent to the present term "solution dolines"); (2) abysses; (3) alluvial dolines. Abysses are steep-sided dolines which continue downwards into caves. Although this doline type is not present in contemporary classifications, it is worth to stress Cvijić's awareness of the link between dolines and vertical shafts, which is recently again in the focus of attention (Šušteršič, 1994; White, 1988; Sauro, 2003). This link is explained in detail by Šušteršič (1994), through the role of vertical shafts (domepits) in the development of dolines, supporting the idea that dolines are "reproductions of the underground karst voids on the surface", or more precisely, features that de-

velop when underlying caverns (domepits) intersect with the surface which is being lowered by karst denudation. On the other hand, one of the points in which Cvijić's opinion turned out to be incorrect, and which was changed in the subsequent years and decades, is his negation of collapse as one of the doline morphogenetic processes.

The Dinaric expression "polje" was used in some references in the second half of the 19th century, even before Cvijić's time (e.g. Mojsisovicz, 1880; cit. by Gams, 1978). However, it was Cvijić (1893, 1895) who made the first scientific introduction of the term. This first official definition states that the polje is "a great karstic depression, of vast flat bottom, with sharp angle between floor and slopes, and its longer axis is always clearly defined, parallel with bedding strike". Cvijić claims that the most typical poljes are situated in Bosnia and Herzegovina. Two main classifications are by the criteria of shape (elongated; circular; irregular) and hydrographical function (dry; seasonally flooded; lake poljes). In the same study, Cvijić explains the dimensional relation between dolines and poljes: "...there are transition forms between poljes and dolines. Smaller of these transitional forms, not exceeding 1 km in diameter, are called dolines, and bigger are called poljes" (Cvijić, 1893, 1895).



Fig. 1. Cvijić's sketch of Četenište uvala in western Serbia (Cvijić, 1926)

Although the uvalas were first mentioned by Cvijić in *Das Karstphänomen*, this was not their "official" introduction. They are mentioned only twice, and was not explained at all (Cvijić, 1893; 1895). The term appeared again in the paper "Glacial and morphological studies on mountains of Bosnia, Herzegovina and Montenegro" (Cvijić, 1899, 1900a), but again without a definition.

The first more precise analysis of uvalas was given in Cvijić's paper about karst poljes of western Bosnia and Herzegovina (1900b, 1901). Here he presented the idea that the uvalas evolve into poljes, inspired by W.M. Davis' concept of erosional cycle (Davis, 1899). Cvijić states that "The difference between them is this: poljes are deeper, their bottoms are flat and without dolines, covered with thick sediments; poljes have characteristic hydrographic features, which are missing in uvalas. But the upper main characteristics of these forms show the direct relation between uvalas and poljes; uvalas are the initial forms, from which poljes evolve". A great number of uvalas are mentioned, mostly within the ridges between poljes. The most interesting example is the Grahovo area, which "consists of small poljes and uvalas" and is described with a lot of details. Finally, Cvijić concludes that "... numerous Grahovo basins are in various stages of development, and therefore no other area is so convenient for studies on poljes development". He additionally states that in Grahovo area one can see "(1) uvalas, from which poljes are formed: Vlasulje, Korita, Isjek; (2) transitional type between uvalas and poljes, and uvala bottoms in poljes: Vedro and Marinkovačko polje, and the flat portion of Grahovsko polje; (3) coalescence of uvalas and poljes, and formation of large poljes of irregular shape; it is clearly visible that all poljes of irregular and strange shape could have been formed by coalescence of uvalas to poljes". In the same work, after the regional outlines, there is a chapter on genesis of karst poljes, in which the "transitional process" doline-uvala-polje is described with more details. The role of denudational process in formation of karst depressions is stressed, stating that "Denudation is a steady process, which lowers the bottom of uvala; the ridges between its dolines are being washed away, and small flat surfaces are developed at the bottom of uvala" (Cvijić, 1900b).



Fig. 2. Cvijić's sketch of Gradac (in Herzegovina), for which he claims that it is "the transition between the uvala and the polje" (Cvijić, 1926) – the theory that was subsequently abandoned

KARSTIC UVALAS AFTER THE TIME OF CVIJIĆ

Davisan theory on cycle of erosion was gradually re-interpreted and adjusted to the variety of settings during the decades that followed. As for the ideas of the karst cycle, the idea was definitely abandoned, in certain way even by Cvijić himself. In one of his latest works, "La géographie des terrains calcaires", although repeating the transitional role of uvala, he also admits that W.M. Davis' cyclic concept is hardly applicable to karst "because karst erosion does not act by same regulations as normal erosion" (Cvijić, 1960). However, the consequences of the previous erroneous concept are felt even nowadays. As the cyclic theory on karst evolution (that dolines evolve into uvalas, and uvalas into poljes) was abandoned, uvalas started to be deprived of the status of an established form of karst surface relief. According to Lowe & Waltham (1995), "The term was introduced to describe features assumed to be the second step in a 3-stage process of polje development, in which dolines were supposed to coalesce into uvalas. This mechanism is no longer accepted and the term uvala has fallen into disuse". The situation was somewhat better in the Slavic and Francophon literature (e.g. Pulina, 1999; Salomon, 2000; Panoš, 2001; etc). The references usually offer the rough genetic concept that uvalas are formed by coalescence of dolines (although in some cases they at the same time claim that this concept is abandoned). Generally, the genetic link between dolines and uvalas is less criticised than the second part of the sequence (uvalas-poljes). As stated by Trudgill (1985): "poljes have a rather different scale and mode of origin". White (1988) approves the usage of a particular term for features sized between dolines and poljes, but favours the expression *compound sink* instead of *uvala*: "I have used the terms *sink-hole* and *doline* interchangeably (...). For features of intermediate size, I use *compound sink* or *valley sink* rather than *uvala*; the uvalas of the Adriatic karst are similar to compound sinks". Sauro (2004), within the first edition of the "Encyclopedia of Caves" (edited by Culver & White, 2004) differs between *compound hollows* and *polygenetic sinks*, and mentions *uvala* only as an occasional synonym for these forms.

In order to help in correction of previous erroneous views and to start towards re-definition of the term *uvala*, the new research has been started (Čalić, 2009; 2011), aiming to bring back the term "uvala" into modern karstological literature. The study included the detailed morphometric and morphological analysis of 43 uvalas in the Dinarides and the Carpatho-Balkanides. On 12 selected examples, structural-geological mapping following the method of Čar (1982, 1986, 2001) was carried out as well. The results

speak in favour of abandoning the cyclic concept in karst evolution, but also strongly support the status of uvalas as a particular form of karst surface depression. The revised definition states that the uvalas are large (in km scale) karst closed depressions of elongated or irregular plan form. Their bottoms are undulating or pitted with dolines, seldom flattened by colluvial sediments. Uvalas are always situated above the karst water table. Origin and development is strongly guided by tectonics.

In the second edition of the “Encyclopedia of Caves” (edited by Culver & White, 2012), these results were taken into account. As opposed to the first edition of this encyclopedia, the second edition includes the explanation that this term was neglected after the abandonment of the karst cyclic concept, but after the revision of the term, it is used together with the terms of compound and polygenetic depressions (Sauro, 2012). In a significant review paper related to the forms of mountain karst, Sauro (2013) mentions uvalas in a positive context as well.

The results of Čalić (2009; 2011) do not support formation of uvalas by coalescence of dolines. The genuine nature of karstic process is not lateral planation, but dissection, because vertical drainage, which is normal in karst, generally dominates over lateral erosion (except at the water table level, e.g. in some poljes). According to many authors (e.g. Williams, 1972), enlargement of dolines leads to the development of polygonal karst, with remnant cones, and not to formation of huge depressions which exceed the size of average dolines by several orders of magnitude. Similar opinion is expressed by Bondesan et al. (1992) as well. It is necessary to stop using the term *uvala* for a large variety of different relief forms – e.g. simple coalesced dolines, segments of dry valleys, blind valleys, etc. This is best explained by Palmer (2007): “The term *uvala* is used in a variety of ways and is sometimes applied to youthful poljes or to dry valleys floored by sinkholes. This term needs to be more clearly defined or abandoned entirely”. In order to keep the term alive and used, we have to make it clear and unambiguous.

The process of the desired “come-back” of uvalas into the most significant karstological references is only at the beginning. Further research is needed to accomplish this task, and it has to include continuation of inventarisation, detailed mapping, and the use of modern methodology and data processing.

ACKNOWLEDGEMENTS: A part of this work was done within the project No. 47007, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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CIRCULATION OF PHOTOGRAPHIC PLATES BETWEEN JOVAN CVIJIĆ AND EMMANUEL DE MARTONNE

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ABSTRACT: This contribution is anchored in the history of geography, or history of geomorphology, to be more precise. Without being a geomorphologist, the author uses a historian's method to study the geomorphological discipline. In this paper, the links between J. Cvijić and French geographers are analyzed. This contribution concerns neither the political point of view, as J. Cvijić's interventions before the committees to prepare the peace treaties of the First World War in Paris in 1919–1920, nor the Central Europe map redrawing, especially the birth of the Kingdom of Serbs, Croats and Slovenes in December 1918. The main question concerns the circulation of knowledge between J. Cvijić and French geographers, by analysing precisely his photographs. By choosing to study the Cvijić's iconography, the author goes beyond the discipline boundaries between physical geography, human geography and ethnography. This contribution is developed in two parts. The starting point is the discovery of about 65 photographic plates from J. Cvijić in the French geographer E. de Martonne's collection in Paris. Three questions are raised: Why are these J. Cvijić's photos in the photographic library of E. Martonne? What does it say about relations between the two geographers? What does it say about J. Cvijić's geographical method, in particular his geography in the field? In the second part, it is explained how J. Cvijić's plates corpus in E. de Martonne's heritage partly reflects his geographical method.

Key words: epistemology, geography, iconography, photography, circulation

INTRODUCTION

In the aim to clarify my research posture, first I would like to mention that I am a science historian at a French Research Center (CNRS) in Paris (UMR Géographie-Cités) in geography. I am very interested in the history of ge-

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ography, including the history of geomorphology. However, I would first like to state that I am not a geomorphologist. Secondly, I work on a particular research subject namely the geographers' photographs and their way of visually representing the field. Thus, by choosing to study the iconography (photographs and drawings) of Jovan Cvijić (1865–1927), I decided, in fact, to go over conventional disciplinary boundaries between physical geography, human geography and ethnology. This approach is quite unusual in French geography and may be also rare in the Serbian one. Third, as French, I now choose to get interested in links between J. Cvijić and French geographers. As a specialist in ties between French and German geographers, which I studied in my thesis (Hallair, 2012), I am particularly interested in studying geographers who were in contact with the German and French schools of geography. Thus, J. Cvijić constitutes a remarkable example. Indeed, he was very well integrated into both the French geography and the German one: on one hand he wrote his thesis on Karst in German, and did it under the supervision of a German geographer Albrecht Penck (1858–1945) in Vienna (Cvijić, 1893). On the other hand, he was welcomed into the exile in France in Paris in 1915, and gave geography course at the Sorbonne University (Vasovic, 1980, 32). But in this communication, I will only focus on the links between J. Cvijić and French geographers.

My main question concerns the knowledge circulation between J. Cvijić and his French colleagues, and I address it through the analysis of his photographs in the form of glass plates.

For this, I choose a double methodological framework: first the method of “cross history”, “connected history” or “global history”¹ developed successively and/or jointly by historians, geographers, sociologists or Germanists, such as Patrick Boucheron & Nicolas Delalande (2009), Michel Espagne (1987, 1988), Christian Grataloup (2009), Serge Gruzinski (2014), Matthias Middell (2007), Michael Werner (1987, 1988, 2004), Bénédicte Zimmermann (2004); these methods can be named “relational approaches”. On the other hand, I rely on the image analysis in social sciences and humanities (Horst Bredekamp & Krois, 2011; Jean-Marc Besse, 2000; Ro-

1 Different methodological approaches are developed to study the history of intersections, interconnections, interrelationships and other hybrids; also called global history or world history in the Anglo-Saxon world, these competing approaches have similarities between them as: they will to go beyond the strictly national framework of historical processes, they will to overcome ethnocentrism researcher and they attach great importance to the notions of exchange and circulation of knowledge, ideas, objects, people, or even diseases. I choose to enroll in the methodological framework that seems most appropriate for my study, namely “cross history” or at least “connected history”.

land Courtot, 2010; Christian Joschke, 2014; Sybille Krämer, 2008; Didier Mendibil 1998, 2001). I further mix this method with the method of the *Practical turn*, as was developed by Loraine Daston and Elizabeth Lunbeck (2011) at the Max-Planck-Institute in Berlin.

The “cross history” as the “connected history” are part of relational approaches. Both allow to explore the connections between local history and history of global phenomena. They are seeking to disengage from the only national perspective. Furthermore, they consider all the possibilities of investigations by crossing the points of view and by recognizing distortions of the exclusively national history. Hence, the “cross history” and the “connected history” allow an analysis combining multiple spatial and temporal scales. These combinations can better capture the research subject, namely the links between the geographer J. Cvijić and French geography through photography.

By choosing a very specific entry through photography, I also anchor myself in what is called in the humanities and social sciences “Practical turn” or “Anthropology of scientific practices”, in line with the works of Bruno Latour (1979, 2010). My method is based on Practical turn. In a transdisciplinary perspective of science history, cultural studies history, and history of geography, my aim is to study the practical frame of geography and the scientific knowledge production. In this field I focus on research objects, representations, tools, and social dimension of scientific practices (such as information items and data exchanges, scientific associations and institutions), material practice (geological sample processing, photographs). I study the main actions of geographical practice: how the geographer observes, notes down, draws, takes pictures, maps, measures. I am interested in special objects (such as photographs, notebooks, maps, tools) and spaces (such as the field work, the laboratory, the office, the lecturehall). These actions and spaces are anchored in a given society with political and economical dimensions (Latour & Woolgar, 1979; Latour, 2010).

In the context of all explanations given above, I will present the J. Cvijić’s glass plates photographs from the E. de Martonne’s collection in Paris according to the flow of geographic knowledge. For this, I will develop my communication into two stages: from J. Cvijić’s archives in Paris... to the “Yugoslav” field. In the first part I wonder about the presence of photographic archives in Paris and on J. Cvijić’s professional relations with Emmanuel de Martonne (1873–1955). In the second part, I analyze two points: the “Yugoslav” field represented in the photographs and the J. Cvijić’s geographical method on the field.

J. CVIJIĆ'S ARCHIVES IN PARIS...

Starting points and questions

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In the iconographic library of the French geographer E. de Martonne in Paris, which has about 11 000 glass plates, I found about 65 plates from J. Cvijić. As geography historian, I ask myself a questions series about this: why are J. Cvijić's photographs present in the library of the geography Paris Institute? How did they come there: e.g., donations, gifts, exchanges? What's the occasion? What can I deduct about professional relations between the two geographers? What do show these plates? What do they teach us about J. Cvijić's geographical method?

65 glass plates from J. Cvijić in the E. de Martonne's collection

The 65 J. Cvijić's plates are found exclusively in the "Yugoslavia"² drawer in the collection, with one exception; indeed, he also provided a glass plate representing a block-diagram named Moravian Karst. While this is a mini-corpus, it has a homogeneity. Moreover, unlike colleagues who have simply provided one or two glass plates, J. Cvijić provided a photographic series, sufficient and diversified to cover a wide range of his geographical interest. I take two hypotheses: first, this mini-corpus is the result of a deliberate choice by J. Cvijić himself, to cover what he considered to visually represent his research field, namely "Yugoslavia". And secondly, the care taken in the photographs' selection expresses the high esteem he felt for E. de Martonne and the importance he gave to his own participation to the enrichment of the Paris glass plate collection. As such, the presence of this photographic mini-corpus in Paris illustrates both the content and the strength of professional exchanges between the two geographers and their geographical centers of interests.

On archival terms, this photographic collection is organized according to geographic divisions into continents, countries, regions and subregions³. The 11 000 glass plates of E. de Martonne's collection is a

2 I use the name "Yugoslavia" and word "Yugoslav" in quotation marks to indicate the temporal distance to a denomination that has varied over the life of J. Cvijić. "Yugoslavia" referred to in this article uses the terminology currently in E. Martonne's collection: built in the Austro-Hungarian Empire, this area was called from December 1918 "Kingdom of Serbs, Croats and Slovenes" then, between January 1929 and April 1941, "Kingdom of Yugoslavia".

3 Subdivisions by countries and regions are those of E. Martonne collection; they reveal a state border dating from the aftermath of the First World War: there are the

Table 1. *Distribution by regions*

Delimited regions in the collection	The quantity of J. Cvijić's glass plates	Archival odds in E. de Martonne's collection		The total number of glass plates in "Yugoslavia" rubric
Généralities	13	eu440(002), eu440(003), eu440(004), eu440(005), eu440(006), eu440(007), eu440(008),	eu440(009), eu440(010) , eu440(014), eu440(020), eu440(021), eu440(022)	25
Slovenia & Istria	0			7
Croatia	13	eu442(004), eu442(007), eu442(008), eu442(009) , eu442(010), eu442(011), eu442(012) ,	eu442(013), eu442(016), eu442(017), eu442(018), eu442(019), eu442(020)	31
Bosnia	3	eu443(034), eu443(035),	eu443(037)	44
Herzegovina	14	eu444(001)bis, eu444(013), eu444(020) , eu444(021) , eu444(022) , eu444(023) , eu444(025),	eu444(031), eu444(032), eu444(033), eu444(034), eu444(037), eu444(040) , eu444(042)	47
Dalmatia	15	eu445(028), eu445(029), eu445(030), eu444(034), eu445(044), eu445(045), eu445(061), eu445(062),	eu445(064), eu445(065) , eu445(066), eu445(070) , eu445(071), eu445(073), eu445(074)	89
Old Serbia	3	eu446(013) , eu446(014) ,	eu446(015)	15
Macedonia	7	eu447(001) , eu447(009), eu447(024), eu447(039) ,	eu447(040) , eu447(041), eu447(042),	47
Montenegro	4	eu448(004), eu448(007),	eu448(011), eu448(012)	15
Total	65			273

Source of data: G. Hallair, 2015

countries that formed by the breakup of the Austro-Hungarian Empire: Yugoslavia, Czechoslovakia, Hungary, etc.

closed photographic fund⁴; the photographs were taken by E. de Martonne himself (about 1 500 have been identified as such) but also by colleagues from the late nineteenth century to the middle of the twentieth century⁵. So the French geographer used his professional network to power its collection, each providing snapshot according to his specialty and his favorite field. Thus, about 150 geographers have fed the collection. This network is international⁶ and shows the exchanges between geographers.

J. Cvijić was part of E. de Martonne's network and consequently has offered some photographs to his French colleague. To power the Parisian collection with photographs of "Yugoslavia"⁷, J. Cvijić has been the biggest contributor: 65 out of 320. Other contributors to this part of the world were: A. Lazić, E. de Martonne, E. Bénévent, J. Brunhes, G. Chabot, Geographical institute of Vienna (maybe a gift from A. Penck to his student E. de Martonne?), Léonardon, V. Daneš and a B. A.

J. Cvijić's photographic contribution concerns only "Yugoslavia", with one exception namely one glass plate about Moravian karst. In two tables I propose to analyze the distribution of his photos for "Yugoslavia": a table of the distribution by regions (see Table 1) and on another of the distribution by geographic sub-disciplines (see Table 2).

In the two tables, I have written in bold the caption of photographs that I will analyze in the second part of the article.

Croatia and Herzegovina are the most represented in the mini-corpus J. Cvijić present in Paris.

4 The photographic collection constituted by E. Martonne was part of the geographical funds from the Library of the Paris Institute of Geography before being hosted by a CNRS Documentation Unit (INTERGEO) that merged in 1994 with another CNRS unit, IMAGEO, to give a birth at UMR PRODIG. This collection underwent many turbulence (German occupation of Paris during World War II, moving in 2005), and this caused some losses, such as: plates cracked, broken or missing.

5 The oldest plate goes back to 1898 and the most recent one is from 1954 (see blog GeoPhoto).

6 Geographers who provided photographs with glass plates are among others: Antipa, H. Baulig, R. Blanchard, I. Bowman, J. Brunhes, G. Chabot, A. Cholley, E. Cholnoky, V. Daneš, A. Demangeon, J. Dresch, Eckert, R. Ficheux, M. Gignoux, F. Jäger, A. Lazić, Léonardon, Loczy, Lozinski, H. Monbeig, F. Nussbaum, A. Ogilvie, Robequain, Romanovsky, Schilling, Szadeczky, Szalay, G. Valsan, G. Vergez-Tricom.

7 This land terminology "Yugoslavia" indicates that the organization of the archival collection date after the First World War, at least for that part of the world; "Yugoslavia", or at least some of its parts, belonged to Austro-Hungarian Empire before the World War 1.

Table 2. *Distribution by geographical themes*

Geographical themes	J. Cvijić's glass plates number
Physical geography (<i>sensu stricto</i>)	35 + 11 = 46
Human geography (population, habitat)	9
Human activities in their surrounding environment	10
Total	65

Source of data: G. Hallair, 2015

The distribution by thematic or geographical sub-disciplines is as follows: 35 plates of physical geography in the strict sense (without human presence, only landforms and karst), plus 11 drawings, maps and sketches - this gives a total of 46. The human geography rubric is composed of plates on population and housing; among these 9 plates, 3 have ethnographic features with locals portraits in traditional costumes (at least appear as such). Finally, 10 plates represent human activities in their environment, especially agricultural activities and water management (wells, water supply).

This thematic distribution shows that an overwhelming majority (46 of 65, i.e., 2/3) of plates J. Cvijić transmitted to E. de Martonne concerns landforms and especially karst forms (cf Figures 1, 2, 4, 5, 6, 7, 8, 13 and 14). This primacy of geomorphology is explained by two facts: first, J. Cvijić was an eminent specialist of karst forms and secondly, E. de Martonne wanted to have this type of photographs in his collection. Indeed, the French geographer was also an internationally recognized geomorphologist too. Moreover geomorphology is the queen of sub-disciplines at that time. The presence of photographs of landform drawings and sketches refers to the explanatory dimension (see below) of the glass plates (cf Figures 4, 8b).

Less significant in number (less than one third), J. Cvijić's photographs corpus to human geography at large reveals the personal interests of the Serbian geographer: habitat (Figures 10, 11), the human activities linked with resources and environment (mountain, plain, etc.), particularly agriculture forms and water management in karst⁸ (Figures 3, 9, 13, 14, 15), different population types recognized by their specific costume (cf Figure 12).

This sub-corpus of 65 photographs is very interesting, because it is both homogeneous and reflects iconic geographical interests of both men. This photographs exchange between the two men reproduces the processes and mechanisms of work reception in general, as was explained for

8 In karst areas, water supplies are underground in aquifers but not on surface.

literature by German reception theorist Hans Robert Jauss (Jauss, 2010): in the exchange between a “donor” offering (in this case J. Cvijić) and a “receiver” (E. de Martonne), the “receiver” also has a status of the one who is “discriminating”, that is to say the one with “a fundamental critical function, which is to retain or reject” (H. R. Jauss, 2010, p. 13). These plates reveal effectively at the same time the E. de Martonne selection of above all geomorphological order, but also this of J. Cvijić, although at first place a geomorphologist, but interested on human geography. Human geography is an emerging sub-discipline at that time and the J. Cvijić’s interest for this make him a pioneer. This early interest in human geography and ethnography is manifested for example by his article published in 1906 in the *Annales de Geographie*, and entitled “Notes on Ethnography of Macedonia” (Cvijić, 1906). The J. Cvijić’s mini-corpus present in E. de Martonne’s collection results in a series of reasoned choices since the offer proposed by J. Cvijić until receipt of E. Martonne through material and contextual exchange conditions: opportunities and technical conditions, financial and human routing, First World War cut, etc.

The photographic libraries challenge for Institutes of geography

At the time of J. Cvijić, photographic libraries were invaluable for institutes of geography in several ways: as research data, as documentary sources and as a teaching tool. Geography is a recent academic discipline that has been formed only from the late nineteenth and early twentieth century. At the beginning, academic institutes of geography were often only a simple “laboratory” namely a room where maps and geological samples were stored. For example, early in his academic career, E. Martonne took care to equip its successive institutes (Rennes, Lyon and Paris⁹) with some geographical material and some documentation resources of high quality, particularly some photographic plates (Baudelle *et al.*, 38–42).

The photograph is a modern tool for geography at that time (Mendibil, 2001, 277–278), while being costly. The field photograph is precious, rare and expensive. Indeed, the photographic material is heavy and bulky to carry on the field of research. The field photograph has besides a dual status: for researching and for teaching. For research, it is one of the preferred tools for field geographers, beside the notebook (Hallair, 2011, 2013a) and the map. The researcher uses photography to record data: it participates in memorization clues to observe and explain a region

9 E. de Martonne was appointed to the University of Rennes in 1899, then he was appointed lecturer at Lyon in 1906, and then professor at the Sorbonne in 1909; he became the first director of the Paris Institute of Geography in 1927.

or phenomenon. The shooting and the angle chosen are not trivial since photograph captures a real built by the photographer; this dimension of a real building is not aware at the time of J. Cvijić, because it is believed that photograph is neutral and objective. This checklist is that photograph allows different time of research: at the time of shooting, and later during drawing or sketching from the photograph to developing an explanatory block-diagram. Next to this research status, the field photograph has a status of pedagogy. Indeed, photographs mounted under glass plates are also to be screened for geography students in lecture halls. Fields or lands which are not easy accessible, because of the distance and the cost of an *in situ* observation, become approachable thanks to projected photographs. This involves expensive equipment but also glass plates development techniques, conservation and projection.

Recognizing the importance of photographs for both research and teaching, E. Martonne constituted his library drawing on the model of German universities¹⁰ in which he went to study for one year at the end of the nineteenth century¹¹; he particularly admired the A. Penck's collection then stationed in Vienna. J. Cvijić and E. de Martonne were there both students of A. Penck. To conclude this first part of the J. Cvijić's photographic archives present in the E. Martonne's collection in Paris, it is necessary to stress the library issues in geography. Not only that the constitution of a rich library brought some prestige to the Institute of Geography in anchoring it in modernity, but its enrichment also took place in part through exchanges with colleagues from other regions and geographers of other countries. The J. Cvijić's mini-corpus of photographs in Paris is to understand in the heart of a triple bottom: the exchange issue, whether domestic or international, the institutionalization issue of academic geography, and, finally, the geographical method on field issue. If much time, energy and finances are devoted to an iconographic library creation, that means that the new geography is developed on the field. It is therefore necessary to show that field, to "save" it by photographs and sketches, to explain it and to make it visible. Therefore a geographical method on field must be developed.

10 The circulation of knowledge takes place between German schools and the young French school of geography in the late nineteenth century; prevailing on the international scene until the turn of the century, German schools were gradually complemented by the French school organized around Paul Vidal de la Blache (1845–1918) and his successors.

11 In 1896–1897, the young E. de Martonne went to study one year in three German-speaking universities: Berlin, Leipzig and Vienna (Hallair, 2007, 28).

The question now, and which is the subject of the second part of this article, is to what extent the J. Cvijić's mini-corpus of E. Martonne's collection allows to understand the geographical method on field of the "Yugoslav" geographer.

... IN THE J. CVIJIĆ'S "YUGOSLAV"

Devoid of tourist sight character, the J. Cvijić's corpus results in a deliberate choice to give the representation of a part of the world, in this case "Yugoslavia", by focusing on landforms as on human activities and human adaptation to his environment. To what extent these photographs reflect the field method of the geographer from Belgrade?

Drawing on a selection of photographs, I chose to analyze both sides of the "Yugoslav" field well documented by J. Cvijić: physical geography side with an iconography corresponding to geomorphology and human geography side. I will discuss the importance of the field in the method of J. Cvijić to legitimize the investigation by geography and place of photograph in this process. I will conclude by showing three types of circulation of knowledge by iconography. In the photographic album attached to this article, a summary table (Table 3) presents the 16 glass plates that I analyze; they are referenced with their original legend in French and their rating in E. Martonne's collection. This Table 3 is preceded by the photographic album itself. I have chosen to present the plates in Table 3 according to the order in my own communication; this order does not necessarily follow the order given by E. Martonne. For example, I put together the plates about the Popovo Polje while they are scattered in the Paris collection.

The geomorphological field

J. Cvijić is internationally well-known as geomorphologist, particularly as specialist for karst forms whom he has fixed the terminology: Serbo-Croatian words of "hum, ouvala, ponor, polje" have been persisting in the geographies of all countries to describe and define the karst. E. Martonne, himself a geomorphologist, was fond of geomorphological plates. Among the 46 pictures of the J. Cvijić's mini-corpus related to geomorphology, I have extracted 10: Figures 1, (Baba cave) 2 (ponor), 4 (block-diagram), 5 (ponors panoramic map), 6 (sinkhole), 7 (lapies), 8b (drawing), 8a and 13 (sinkhole), 14 (bottom of ouvala). They illustrate geographical method on field of J. Cvijić, including the following:

- Photographic shooting from a top for a clear overview in order to observe the landscape and panoramic views. This was also the way

that E. Martonne has practiced, as I have shown by analyzing its tour books through the Carpathians (Hallair, 2011, 2013).

- The use of photographic close-ups to describe a specific and individualized karst form: the entrance to a cave (Figure 1), a ponor (Figure 2), a sinkhole (Figures 6, 13), vertical lapies (Figure 7).
- The use of wider photographic panoramic plans for understanding operation: for example the succession of ponors of Pezter (Figure 5), the ouvalas funds (Figure 14) and the sinkholes (Figure 15).
- Photographic shooting most often includes human beings in the aim to provide a scale to landforms (see Figures 1, 5, 6, 7, 15).

Human geography and ethnology

In comparison with his contemporary colleagues, the originality of J. Cvijić expressed itself by his early interest in human geography at large. Although the interest of E. Martonne has appeared less for human geography, this latter chose to keep snapshots of J. Cvijić on the issues of the time related to human geography, namely:

- The isolated habitat (Figure 10) and grouped housing (Figure 11).
- The type of population recognizable thanks to their costume (see Figure 12). The photographs in the form of portrait of an individual or a family wearing traditional costumes are very close to those of the ethnologists.
- Human activities. In the mini-corpus, only agricultural activities are represented (Figure 13, 14, 15). The photographs show a linking between firstly the mountain or plain environment marked by drought and surface karst, and secondly an agricultural development taking advantage of the best land. We can see this agricultural development often in the background of the sinkhole (Figures 13, 14, 15) and based on a specific management of water as wells and cisterns (Figures 3, 9).

The photographs related to human geography certainly describe populations but also try to show the links between human-being and his environment through including the use of wide shots to encompass the surrounding environment of the look (plain, depression, mountain) and human activities (agriculture). Even if I try to avoid over-interpretation of today's researcher who analyzes photographs taken almost a century ago, J. Cvijić seemed eager to show, through his photographs and his choices of the view angles, adaptation of human-being to his environment; at least, he showed the organization set up to manage water and farming. That is clear to the water supply, a very important function in a country where surface water

is scarce. For example, Figures 3 and 9¹² show people bringing back water in canisters loaded on the backs of men and on horseback, which suggests that the water point is far enough away from a village and perhaps not only serves for a single village. The recovered water is intended for the needs of humans, animals and crops.

Continuing the analysis on reception of phenomena between photographs offered by J. Cvijić and insertion of these ones by E. de Martonne, it is interesting to note that some legends, perhaps written by E. de Martonne rather than by J. Cvijić, are putting the emphasis on physical geography data without establishing the link with human activities yet represented: as in Figures 13 and 14, the karst is put forward (sinkholes and ouvalas) without any mention of lived space, namely the cultivation in different plots separated by stone walls. The legend ignores the human and agricultural activities yet visible on the photographs which show an enhancement of the natural environment, namely the cultivation in the bottom depressions where land is most fertile. This analysis joins the one that D. Mendibil has delivered by comparing descriptions of P. Vidal de la Blache (1845–1918) and E. de Martonne: for the same place, the description of E. de Martonne does almost not mention lived space, unlike his stepfather Vidal de la Blache (Mendibil, 2001, 279).

Whether physical geography or human geography, the corpus of glass plates present in the collection of E. Martonne reflects the field method of both geographers. If the field photographs are so important for both J. Cvijić and E. Martonne, this reveals that, beyond their status as “data collector” and educational “recorder”, these photographs legitimize the geographical investigation.

The field photograph to legitimize the geographical survey

Geography keeps some features inherited from exploration; the “modern geography” or new geography is defined as “full wind geography” as opposed to “cabinet geography”¹³ (Robic, 2010) namely in its relation to the field. Valuing the sporting qualities and muscular endurance, geographers undertook field trips dedicated to research as well as teaching. J. Cvijić as E. de Martonne (Hallair, 2011, 2013) traversed on foot and riding thousands of kilometers to collect themselves on the field geographic data. At the University of Vienna, in the late nineteenth century, A. Penck organized field trips;

12 For this glass plate, I refer to the analysis I provided on my blog Geophoto: <http://geophoto.hypotheses.org/343>

13 The “cabinet of geography” was collecting its data from travel books already published and second-hand reports.

his students J. Cvijić and E. de Martonne followed them and extended this teaching going on the field for their research. In turn, they organized trips once in place at the university¹⁴. At the time of J. Cvijić and E. Martonne, field legitimated geographical approach (Blanckaert, 1996). And photograph was the empirical evidence brought back from the research field that validated the geographic observation, description and explanation.

On the field, the “modern” geographers collected different data for observation, description, explanation and visualization of geographic forms, phenomena and process. They collected “pieces of scenery” *via* photographs, geological samples, and for some as Cvijić, life stories. Field photographs provided tangible evidence that the geographer was physically confronted with a reality that appeared to contemporaries as given and objective¹⁵. As the geological specimen collection, photographs brought back from research field brought proof of the geographical approach, and thereby even legitimated geographical discipline as a science¹⁶. However, not everything can be photographed: photographs do not reveal all of the J. Cvijić’s approach on the field. Indeed, to trace the history of the Balkan peoples and their migrations¹⁷, J. Cvijić led surveys of residents to collect life stories; for that, he relied on a network of correspondents such as teachers. Thus, he proceeded from a sociological approach or at least anthropological one.

Field photograph legitimate geographical approach and also helps this field knowledge to circulate. I will conclude this article by showing three types of knowledge circulation by iconography.

Field knowledge circulation by iconography

The J. Cvijić’s corpus illustrates three types of knowledge circulation that field photograph allows: first, the links between photograph and synthetic sketches resulting therefrom, second, possible affiliations between geographers belonging to different countries namely W. M. Davis (1850–1934), J. Cvijić, E. de Martonne about block-diagrams, and finally an illustration of a process of “French” regional geography through the example shots of J. Cvijić for Popovo Polje in Bosnia and Herzegovina.

14 In his first post in Rennes in Brittany, E. Martonne established in June 1905 the first inter-university tour bringing together geographers from the whole of France.

15 Currently, the photographed landscape appears as a cultural or as other built.

16 All discipline is defined by a definition, by some basic concepts, and by scientific approach and method.

17 J. Cvijić forged a new term to characterize these types of migration: “*métanastases*” in French.

Through the collection and recording of geographical data, the field photograph allows tweaking the data once back from the field. This relationship between collection and memory induces a certain temporality of the research, which can thus be done in several stages. After the time of the snapshot comes a few hours or a few days later the time to the synthesis in the form of drawings and sketches. These drawings and sketches are more abstract and correspond to a selective and rational sorting of observed, described and explained data in the aim of demonstrate. From photographs, J. Cvijić drew and sketched, as illustrated in Figure 8a (Prolozoac field) and sketches layout (Figure 8b). Contrary to the photograph that captures all, the drawing is already a step towards the explanation because a conscious and rational selection of items is done at the expense of other unsuccessful details. Once done, sketches and drawings have been in turn photographed in the aim to be projected in the lecture halls or to illustrate an article or book. R. Courtot and M. Sivignon (2015) argue that E. de Martonne's influence on J. Cvijić is here evident in the practice of drawing and sketching made from photographs. Drawing or sketch done from photographs may also have already been sketched *in situ* in a field notebook. As photographic camera, the notebook comes with the geographer on the field¹⁸.

The form of graphical and visual representation chosen both to describe and explain a landscape is reflected in the block-diagram, as J. Cvijić realized about the Popovo polje (Figure 4). The block-diagram can trace back a possible affiliation between the US geomorphologist W. M. Davis "inventor" of the block-diagram (Broc, 2010, 246), E. Martonne who got it from W. M. Davis, and finally J. Cvijić who may be inspired by E. Martonne or directly by the American geographer. These three colleagues, who knew each other, have often practiced block-diagram (Courtot, 2010; Philipponneau, 1951). The development and use of the block-diagram by these three geographers highlight the knowledge circulation between the different schools of geography. J. Cvijić's block-diagram relative to Popovo polje is in the collection of E. de Martonne and was photographed for educational purposes in order to be projected in lecture hall.

The example of Popovo polje, well documented in the collection of E. de Martonne¹⁹, allows further analysis of exchange and the flow of geographic knowledge. Indeed, the J. Cvijić's corpus plates present in Paris

18 For a study of E. Martonne's sketches in his field notebooks, see G. Hallair 2011a, b, 2013a.

19 About 17 glass plates concern Popovo polje. The identified authors are J. Cvijić (five plates) and Georges Chabot (1890-1975) for four plates; eight plates remain anonymous.

offer a complete visualization of Popovo polje, combining the physical geography and human geography data and synthesizing all in a block-diagram (Figures 1, 2, 3, 4). The series of four snapshots helps to understand the geography of the region, the links between the different elements that compose it and how the inhabitants take advantage of their environment by organizing themselves. According to his geographical method on field (see above), J. Cvijić articulated through his photographs the problem of human-being and water in karst: observation, description, explanation of karst forms and phenomena, especially the appearance and/or disappearance of water, and the specific forms of the water management that are associated namely wells and tanks.

I hypothesize that this series of Popovo polje expresses a form of regional geography in the descriptive and explanatory perspective of French regional geography. Extrapolating to the entire J. Cvijić's corpus present in Paris, it appears indeed that beyond the description of forms related to karst, habitat, management of water, agricultural use and traditional costumes, the 65 glass plates are trying to establish explanatory links between all the data collected; their aim seems to be to identify the "geographic personality" of "Yugoslavia", as summarized P. Vidal de la Blache about regional geography method. So it seems that J. Cvijić was based on the French model of regional geography much more than on the *Landeskunde* or *Länderkunde* of the German school. This latter one, very stereotyped with an identical plan, aims above all the meticulous description of a region through the much-maligned "drawer plan" or Alfred Hettner's *Länderkundliche Schema* (Hallair, 2010, t 2, 178–188).

CONCLUSION

The analysis of the J. Cvijić's glass plates in the Paris collection of the French geographer E. Martonne reveals exchanges between both geographers. The concrete object "geographic photograph", both rare, valuable and expensive, is part of the panoply of modern geographer's tools. The analysis of the plates, which 16 are presented in album, shows all the importance of photograph in the history of geographical institutes and for institutionalization of the geographical discipline. J. Cvijić's corpus in Paris is rich and varied enough for a glimpse of a large part of his geographical method: as geographer on field, he was as much interested in the physical geography as human geography, even flirting with ethnology. His concern to make feel and understand the "personality of the geography of Yugoslavia" thanks to iconography is very similar to the method called French

regional geography, in contrast to the *Länderkunde* of the German school. Beyond the French regional geography approach, there are other processes of geographical knowledge circulation: such as that of the graphic visual representation of synthetic sketches, particularly in the form of block-diagrams. The block-diagram, both descriptive and explanatory, shows the movement of ideas and methods between the American School of W. M. Davis, the French school of E. Martonne and the “Yugoslav” one around J. Cvijić. Furthermore, in terms of reception related process, any exchange implies a choice between acceptance and refusal; as such, the presence of 65 J. Cvijić’s photographs in Paris says as much about the geographical method of J. Cvijić as on E. de Martonne’s one.

Geographical science, like any science, is formed, thrives and grows from exchanges at different levels: international, national and local. The ties of reciprocity, circulation and exchanges were highlighted here between J. Cvijić and E. de Martonne via photography and iconography in general. To further explore these links in the context of the relational approaches of “cross history” or “connected history” and to analyze the emergence of a Serbian geography, homogeneous and built around J. Cvijić, it is also necessary to open thinking to other media of the circulation of knowledge. The study of the writings of J. Cvijić and its reception in France should measure how J. Cvijić is a reference for the French geographers. For example, bibliographic references, but also references and sketches written in the text to chapter “Yugoslavia” of the *Universal Geography* (Chataigneau, 1934) gives pride to J. Cvijić. To make the link between writing and image from or upon J. Cvijić, I end with a last photograph of the J. Cvijić corpus in Paris which is also present in the *Universal Geography* (Chataigneau, 1934, p. 450): an alluvial sinkhole nearby Sjenica (Serbia) (Figure 6).

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PHOTOGRAPHIC ALBUM



Fig. 1. *La jama Baba du poljé de Popovo*
Eu444(040)



Fig. 2. *Ponor de Popovo Poljé* Eu444(023)



Fig. 3. *Herzégovine. Une citerne dans le Popovo Poljé* Eu444(020)

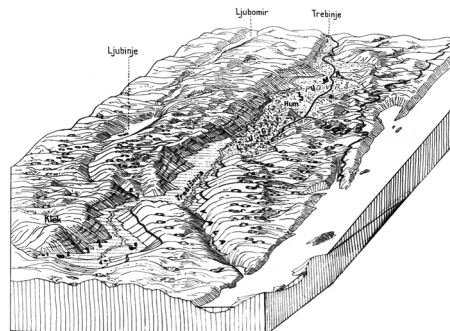


Fig. 4. *Le poljé de Popovo. Trebišnica. Cvijić*
Eu440(021)



Fig. 5. *Serbie. Abaissement successif des ponors de Pezter.* Cvijić Eu446(014)



Fig. 6. Doline alluviale près Sjenica Serbie (Sandjak) Cvijić Eu446(013)

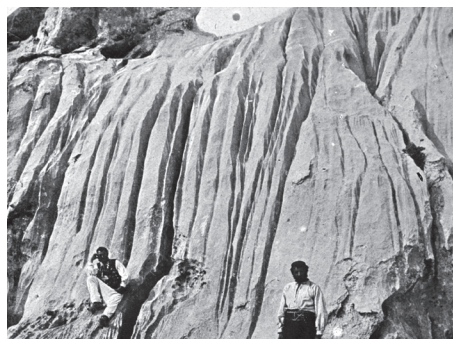


Fig. 7. Lapiès verticaux, Dalmatie, Cvijić Eu440(022) [detail]



Fig. 8a. Dalmatie. Dolines grandes et profondes près de Prolozoac. Eu445(070)



Fig. 9. Velebit. Calcaire fissuré, puits à eau. Cvijić Eu442(009)



Fig. 8b. Dalmatie, Prolozoac. Profondes dolines don't certaines atteignent le réseau aquifère. Cvijić. Eu440(010)



Fig. 10. Sur la route entre Mitrivica et Novi Pazar Eu447(001)



Fig. 11. Le village koutzo-valaque Malovitché près de Monastir Eu447(039)



Fig. 12. Une famille paysanne de la plaine de Monastir Eu447(040)



Fig. 13. Velebit, lokva. Doline pavée avec fissures bouchées Eu442(012)

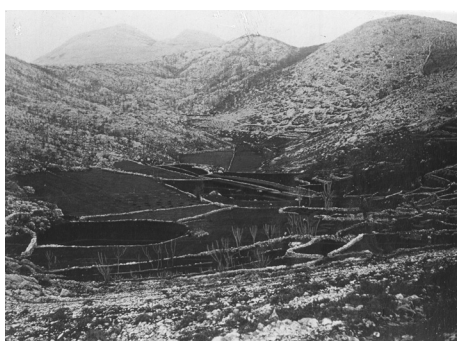


Fig. 14. Le fond d'une ouvala, stade avancé. Grab-Herzegovine Eu444(042)



Fig. 15. Makarska. Adriatique. Doline, fond divisé entre 18 propriétaires Eu 445(065)

Table 3. *Photographic plates I use in the article*

Numéro de la photographie	Cote de la photographie	Légende indiquée sur la plaque	Sous-région de la collection de Paris
1	Eu444(040)	<i>La jama Baba du poljé de Popovo</i>	Herzégovine
2	Eu444(023)	<i>Ponor de Popovo Poljé</i>	Herzégovine
3	Eu444(020)	<i>Herzégovine. Une citerne dans le Popovo Poljé</i>	Herzégovine
4	Eu440(021)	<i>Le poljé de Popovo. Trebisnica. Cvijic</i>	Herzégovine
5	Eu446(014)	<i>Serbie. Abaissement successif des ponors de Pezter. Cvijic</i>	Vieille serbie
6	Eu446(013)	<i>Doline alluviale près Sjenica Serbie (Sandjak) Cvijic</i>	Vieille serbie
7	Eu440(022)	<i>Lapiès verticaux, Dalmatie, Cvijic</i>	Dalmatie
8a	Eu445(070)	<i>Dalmatie. Dolines grandes et profondes près de Prolozoac.</i>	Généralités
8b	Eu440(010)	<i>Dalmatie, Prolozoac. Profondes dolines don't certaines atteignent le réseau aquifère. Cvijic</i>	Généralités
9	Eu442(009)	<i>Velebit. Calcaire fissuré, puits à eau. Cvijic</i>	Croatie
10	Eu447(001)	<i>Sur la route entre Mitrovica et Novi-Pazar. Cvijic</i>	Macédoine
11	Eu447(039)	<i>Le village koutzo-valaque Malovitché près de Monastir</i>	Macédoine
12	Eu447(040)	<i>Une famille paysanne de la plaine de Monastir</i>	Macédoine
13	Eu442(012)	<i>Velebit, lokva. Doline pavée avec fissures bouchées</i>	Croatie
14	Eu444(042)	<i>Le fond d'une ouvala, stade avancé. Grab-Herzegovine</i>	Herzégovine
15	Eu445(065)	<i>Makarska. Adriatique. Doline, fond divisé entre 18 propriétaires</i>	Dalmatie

Source of data: G. Hallair, 2015

A HUNDRED YEAR ANNIVERSARY OF AN IMPORTANT KARST GEOMORPHOLOGY BOOK

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ABSTRACT: In 1915 the Yearbook of the Sofia University published the Ph.D. dissertation entitled "Karst Landforms in West Stara Planina" by the Bulgarian geomorphologist Prof. Zheko Radev. The book represents an excellent morphographic overview on the karst massifs from the western part of the Balkan range: Vidlič Mt., Ponor Mt., Koznitsa Mt., Vratsa Mt., etc. The same ones are amongst the most interesting karst areas in Bulgaria and Eastern Serbia with variety of surface (karren fields, dolines and uvalas of different types) and subsurface (caves, pot-holes) karst landforms. Radev extensively cited the pioneer karstological works of the famous Serbian geographer Jovan Cvijić. The aim of the paper is to point out the theoretical contribution in karstology of this monograph. Radev examined the stage development of the karst landscape in the studied area in connection with the stages of tectonic uplift. He wrote about "evolutional karst labels" long before the usage of the terms "karst (cave) stage", "step-like karst", etc., became common in the karstological literature. Unfortunately, this monograph is almost completely unknown to the foreign scientists, because it was published in the Bulgarian language only.

Key words: Zheko Radev, karst, caves, geomorphology, West Stara Planina

INTRODUCTION

The karst features are natural phenomena which are spread over 22.7% of the territory of Bulgaria (Popov, 1970, Angelova, 2003). About 26170 km² are covered by karstified rocks of different age: Proterozoic marbles in the mountains of South Bulgaria (Pirin, Rhodopes), Mesozoic limestones and dolomites (Triassic, Jurassic and Cretaceous) in Central Bulgaria (Stara

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Fig. 1. Prof. Zheko Radev
(1875–1934)

Planina and Fore-Balkan) and Neogene limestones on the NE Bulgarian Black Sea Coast.

One of the pioneers of the karst science in the country is Prof. Zheko Radev. The aim of this paper is to point out the contribution of Radev in karst geomorphology in the year of his 140th anniversary and the 100th anniversary of his most important karst publication – “Karst Landforms in West Stara Planina”.

PROF. ZHEKO RADEV – BIOGRAPHICAL NOTES

Zheko Radev (Figure 1) was born on July 31st 1875 in the small town of Novi Pazar near Shumen, NE Bulgaria. He graduated from the pedagogical school in Shumen and was a school teacher in Novi Pazar, Preslav and village of Varbitsa. In 1900 he became a student of philosophy and pedagogy at the University of Sofia (Batakliiev, 1934).

Radev completed his university education in 1904 and became a teacher of geography in Bourgas. His first scientific publication is “A few notes on the climate of Bourgas”, published in the Yearbook of the Sofia University (Radev, 1906). As an assistant to the founder of the Bulgarian geography Prof. Anastas Ishirkov in Sofia University, he wrote the paper “Our settlements in connection with their altitude”.

In 1910 Radev wrote a 32-page paper “Rila Mountain – orohydrographical notes”, which is among the best geomorphologic descriptions of the highest mountain of the Balkan Peninsula (Radev, 1910). The following year he was accepted for doctoral studies on physical geography at the Berlin University. His supervisor was Prof. Albrecht Penck – one of the founders of European geomorphology. The famous scientist directed his student to the problems of the karst geomorphology in Bulgaria. The title of his thesis was “Karst Landforms in West Stara Planina.”. Having defended his dissertation in 1914, Radev became an Associate Professor of geography at the “St. Climent Ohridsky” Sofia University. As a teacher, he was liked by his students because of numerous field excursions and practices. As a professor, Zheko Radev wrote a lot of monographs and papers on the glacial and fluvial geomorphology of Bulgaria. Among them the most important are “Geomorphological features of the Bulgarian lands and their importance for the temperature and precipitation relations of the country” (Radev, 1919) “The natural sculpture of the highest Bulgarian mountains”(130 p., 4 maps, 16 photos) (Radev, 1920), “Are there traces of diluvial glaciation of Vitosha” (Radev, 1926), “East Stara Planina and

the valley of Kamchia River” (Radev, 1927) and “Epigenetic gorges in the valley of Struma River” (Radev, 1933). His 19 monographs and papers have been a model of professionalism and work precision for generations of Bulgarian geographers.

Prof. Radev was one of the founders of the Bulgarian Geographical Society on November 9th 1919 and served as the Society secretary and Vice President for years. Zheko Radev died in Sofia on January 24th 1934.

KARST LANDFORMS IN WEST STARA PLANINA – AN IMPORTANT KARST MONOGRAPH

In 1915, in a separate print of the Yearbook of Sofia University the dissertation of Zheko Radev was published (Figure 2). In addition to the brilliant explanation of the epikarstic landforms (karren, karren fields, karst springs, dolines and uvalas) Radev mapped and explored 12 caves for first time, among which Temnata Dupka Cave near Lakatnik Railway Station in the Iskar River Gorge (the longest cave in the Stara Planina (Balkan) range – 9000 m) (Figure 3), Temnata Dupka Cave near Kalotina village (493 m), Dushnika Cave near Iskrets karst springs (876 m), Vodnata Cave near Tzerovo at the Stara Planina Iskar Gorge (3264 m), Ledenika Cave in Vratsa Mountain (show-cave from 1961, 320 m), etc.

The monograph represents a detailed geomorphic overview on the karst massifs in Bulgaria (Vratsa Mountain, Ponor Mountain, Chepan Mountain, Sofia Mountain) and Eastern Serbia (Vidlič Mountain, Odorovac Polje - at Radev’s time Smilec Polje), etc. At the end of the book 68 precise photographs of the karst areas are annexed.

Radev extensively cited Jovan Cvijić. For example at the beginning of the chapter “Dolines and uvalas” he wrote: “Particularly well and fairly comprehensive look at this question is given in the monograph of Dr. Jov. Cvijić “Das Karstphänomen” 1893, based on the available literature and own observations and studies of the Adriatic Coast, Bosnia, Serbia, Herzegovina and others.” (Radev, 1915,14). Prof. Cvijić is also cited by Radev in connection to the tectonic structures of the West Stara Planina (Cvijić, 1902, In: Radev, 1915, 38) and karst features (Cvijić, 1893, In: Radev, 1915, 6).

Zheko Radev’s important contribution of the relationship between tectonic movements and the development of karst can be found in the final part of his dissertation: “With the gradual lifting of the mountain the dis-

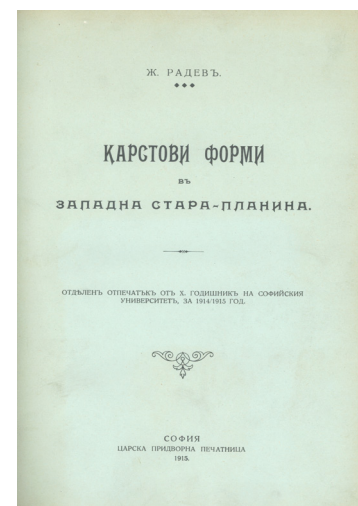


Fig. 2. “Karst landforms in West Stara Planina” – cover page

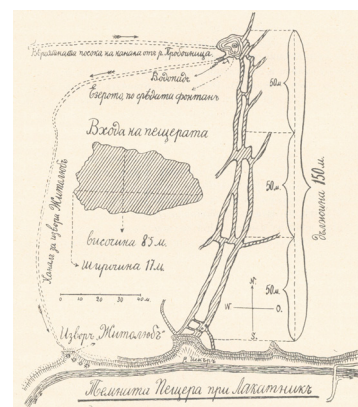


Fig. 3. The first map of the entrance parts of Temnata Dupka Cave in Stara Planina Iskar Gorge (Radev, 1915)

positions of the impermeable layers that make the basis of the karst water have changed. With passage of time this situation started to carry the power of mechanical erosion, thus creating new evolutionary levels and new changes in the karst terrain...With these changes of the base of the karst water, the action of some watercourses ends and transfers the center of gravity into completely different parts. The last factor creates conditions for a new reconstruction of the karst landforms" (Radev, 1915,130).



Fig. 4. *The entrance of Temnata Dupka Cave (up) and Lakatnik Rocks near Lakatnik Railway Station (down) in 1915 (Radev, 1915) and today*

These few sentences present the idea of the leveled karst depending on the vertical tectonic movements. The term "evolutionary level" is introduced in karst science by Savicki a few years earlier and defined as water level below which the cave development is impossible (Savicki, 1909). It should be noted that the Bulgarian scientist was one of the first in Europe together with

Cvijić, Savicki and Penck who accepted and introduced the theory of the geographic cycle of Davis in the study of karst areas. The final chapter is called "Cycles in the development of karst terrain" indicating the presence of three groups of karst landforms corresponding to the young, mature and old stage of the relief. Interestingly enough, William Morris Davis used his own paradigm to the problems of karst and cave development fifteen years later (Davis, 1930).



Fig. 5. Top: The area of Iskrets karst springs in 1915 and 2015. Bottom: The entrance of Dushnika Cave (876 m) near the village of Iskrets in 1915 and the same place today

CONCLUSION

The karst landscapes of the West Stara Planina have been widely covered by vegetation in recent decades. Comparing the pictures of Radev with the contemporary photographs of the same places (Figures 4 and 5) it is clearly visible that the naked karst of the beginning of the twentieth cen-

ture is strongly altered and recovered by trees. The same feature can be established in parts of the classical karst in Slovenia and Croatia, where overgrazing by goats has been prohibited since 1948 (Gvozdetsky, 1988).

A similar explanation for the landscape change can be applied for the mountains of the West Stara Planina. For example more than 50 big farms are marked on the topographical map of Bazovski Part of Vratsa Mountain with the area of only 67 km² in the middle of the twentieth century. Nowadays the mountainous farms are very rare at the Bulgarian part of the West Stara Planina Mountains. At the same time, artificial afforestation with *Pinus Nigra* and other species was common in the sixties in some of the karst areas (Tranteev, 1969).

The year of celebration of the 150th anniversary of Prof. Jovan Cvijić and 140 years since the birth of Prof. Zheko Radev is an excellent occasion to plan for increasing cooperation between the Serbian and Bulgarian karst scientists to study Stara Planina and other karst massifs.

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PROBLEMS RELATED TO THE DETERMINATION OF RIVER NETWORK DENSITY IN SERBIA

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ABSTRACT: The river network density is a topographic indicator significant for hydrological and geomorphological research. Determination of the river network density is more complex than it seems at first sight. This paper presents the history of determining the river network density in Serbia, as well as the related problems. The river network density in Serbia has been measured and estimated several times. The first measurements and calculation of the river network density in Serbia were conducted with 1:75 000 scale maps under the leadership of Jovan Cvijić in the period 1894–1896. Subsequent measurement was accomplished with 1:200,000 scale maps by the Ministry of Agriculture and Water of the Kingdom of Serbs, Croats and Slovenians in the early twenties of the XX century. Dušan Dukić gave the estimate of the river network density by extrapolation method in the late fifties. Data from the “Catalogue of Rivers in the Federal Republic of Yugoslavia”, made by the Federal Hydrometeorological Institute in 1995, are based on the measurements on the 1: 100,000 and 1: 200,000 scale maps. Today, data on river network in the digital format are available with different levels of detail (from 1: 200,000 to 1: 1,000,000). Problems related to the determination of river networks density can be of theoretical (definition of river network) and/or technical-methodological character (data source and measurement method).

Key words: density of river network, river network, hydrographic network, hydrography, Serbia

INTRODUCTION

River network is considered as one of the main hydrological characteristics of a given area. According to most authors, *river network* represents all natural watercourses of a territory (Jevđević, 1956; Dukić, 1958; Dukić &

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Gavrilović, 2008; Prohaska 2003). There is another term that is used – *hydrographic network*. Some authors believe that there are no quantitative criteria for distinguishing river from hydrographic network (Prohaska, 2003), while others qualitatively differ them, defining hydrographic network as a broader term that beside watercourses encompasses lakes, glaciers, ponds and swamps (Dukić & Gavrilović, 2008).

The basic characteristics of river networks are: types of watercourse, length, density and frequency of watercourses, the average distance between two tributaries etc. These features depend on the number of physical – geographic factors and largely on climatic characteristics of the terrain (especially precipitation), geological conditions, vegetation type, and anthropological factors.

Types of watercourses that make up the river network. Most authors agree that the river network consists of all permanent, periodic and occasional natural watercourses. They also believe that it can be separated into the river network of permanent, periodic and occasional natural watercourses as an individual river networks.

Length of the watercourse is the distance between the beginning and the end of watercourse measured along watercourse. Beginning of watercourse can be the source or the confluence of two or more rivers. There are certain rules in determination of the beginning of watercourse, but in the case of their insufficiency, the beginning is determined by agreement. Length of the watercourse depends on the relief and slope. Thus, short streams are typical for mountain and hilly terrains, while lowland terrains are characterized by longer watercourses.

Two indicators are most frequently used for defining the characteristics of the river network: *density of river network* and *the frequency of watercourse*. *Density of river network (DRN)* means the length of watercourses per unit area, while *frequency of watercourse* represents number of watercourses per unit area.

The study of the DRN is important because it points to the orographic, lithology, soil and vegetation characteristics of the area, as well as the influence of man (Gregory & Walling, 1973), and therefore it is important for hydrological and geomorphological research. The DRN indicates the time during which water travels to the riverbed (Langbein, 1947), i.e. points out water drainage characteristics of an area. It is believed that the denser the river network is, the shorter the time is for water to reach the river bed. Under the same climate conditions a high value of DRN is a feature of water impermeable terrain, while low value is typical for water permeable terrains. The dense river network enables quick runoff, so

hydrographs of those rivers are steeper and narrower, and extremes (maximal and minimal discharges) are more emphasized than the average high and low water (Jevđević, 1956), and may indicate the possible occurrence of flooding (Gavrilović & Dukić, 2008). River networks in forests are sparse in relation to land with another type of vegetation. Anthropogeographical factors such as urbanization (transforming surface watercourses in underground flows), regulation works on watercourses (meanders cutting) and the like, make river network shorter, and its density smaller.

The DRN is certainly one of the indicators of water resources of a certain area. Therefore many authors who have studied the DRN believe that it is necessary to determine it from the maps of larger scale or from maps of higher level of details. However, DRN by itself does not say enough. Due to various meanings of this parameter the purpose of its calculation should be determined. The purpose of the calculation will determine which watercourses satisfy the criteria of the input parameters. This paper presents historical overview of determination of DRN in Serbia and points out the problems that occurred during its determination, as in the past as well today.

THE HISTORY OF THE DETERMINATION OF DENSITY OF RIVER NETWORK – MEASUREMENT AND ESTIMATION

Back in year 1880 Jovan Mišković pointed out the importance of studying hydrography, by which he meant “the description of the waters” (Mišković, 1880). His hydrographic survey of the Independent Principality of Serbia is the first systematic description of the river network of this region in which a list of watercourses is provided and their belonging to the river basins, and thus represents the first catalogue of watercourses in the text format. In this catalogue he gave a detailed description of the watershed boundaries. He also provides the length of the longest valleys and in several places watercourse widths. This paper sets out some of the basics of hydrographic methodologies such as the method of determining (orienting) river banks and valley sides, method of diverting “dry” and “water” state border and deals with the origin of the watercourses name. The significance of this work is that it provides the basis for studies of river network in Serbia. Also, the author was aware that the work in this field just begun and provided guidance to the development of this research.

The next significant step in the study of hydrography of Serbia was measuring the length of rivers and river basins areas in Serbia. Jovan Cvijić gives the first data about these parameters in 1901 (Cvijić, 1901). Along

with the results of this measurement, Cvijić also provides data of previous and one later measurement of area of the Kingdom of Serbia. Measurements of the area of the Kingdom of Serbia that preceded Cvijić's measurement were done mostly on a small scale maps with planimeters, except one which used a map scale of 1:75 000, on millimeter paper, which is less reliable. The measurement, which was done after Cvijić with maps scale of 1:50 000 using planimeters, gave similar results to those obtained by Cvijić.

Jovan Cvijić and his colleagues at the Institute of Geography of the Great School have measured river basin areas and river lengths on the territory of the Kingdom of Serbia in the period 1893–1896. The data was published only for a selected number of watercourses and their respective basins (Cvijić, 1901), so from that point of view it is not possible to calculate the DRN on the basis of published data. Table 1 provides the data on the length of the watercourses that is obtained by adding the length of all watercourses published in the cited paper. These measurements were based on the data from sections of the Special Headquarters map of the Kingdom of Serbia scale 1:75 000, where planimeters, curvimeters and millimeter paper were used for measurement. Each measurement was performed three times, and then the arithmetic mean was calculated, which was taken as the measurement result. The data are presented by river basins. Five years later, Cvijić and his colleagues continued the measurements of river basin areas and river lengths on the territory of Macedonia and ancient Serbia. They used the maps at the scale 1:200 000 and these data were published by Radoje Dedinac (Dedinac, 1906).

Aware of the measurement problems, in both publications Cvijić and Dedinac described in detail the methodology used, stating the problems they encountered. Problems related to the accuracy of the measurements specified by Cvijić can be classified into two groups:

- *Problems related to the data source and the media containing them.* Cvijić commented them more when talking about measurement of river lengths rather than basin areas, remarking that when maps are drawn, irrespectively of the projection, “stretching” of rivers in all directions always ensues, and that regardless of the scale, there is always a generalization of river lengths. On this occasion he emphasized that the larger the scale map is the more realistic measurements are. This group of problems includes the problem of stretching and folding sheets of paper when printing sections of the map.
- *Problems related to the accuracy of the instruments used in measurements.* Cvijić stated that the reliability of river lengths data is lower (measured by curvimeters) than data on basin areas (measured by planimeter and millimeter paper).

The General Water Directorate of the Ministry of Agriculture and Water of the Kingdom of Serbs, Croats and Slovenians in the period 1920–1924 created *“The inventory of watercourses in the Kingdom of Serbs, Croats and Slovenians”* (Ministry of Agriculture and Water, 1924), which still represents the most detailed catalogue of rivers in Serbia. In the *“Inventory”* catchment areas, lengths and slopes of rivers are presented. The measurements were done on the basis of military topographic map scale 1: 200 000, where only watercourses longer than 10 km were measured. The *“Inventory”* includes data for 1851 watercourse of former territory of the Kingdom of SCS or 646 watercourses within the boundaries of the present Republic of Serbia. According to these figures, the total length of watercourses within the boundaries of the present Republic of Serbia is 17 081 km, and the calculated DRN is 193 m/km². The authors of the *“Inventory”* point out that the data from this measurement have only planimetric and orographic character and do not have the elements from which one could get a sense of the watercourses regime and especially not on the amount of water in watercourses.

Table 1. Overview of measurements and estimations of length and density of river network in Serbia*

Territory	Area (km ²)	Length of river network (m)	Density of river network (m/km ²)	Scale	Source of data
Data obtained from the analog data sources					
Kingdom of Serbia	48283	8 022 600	166	1: 75 000	Cvijić, 1901
Kingdom of Serbs, Croats, Slovenians	88496	17 080 900	193	1: 200 000	Ministry of agriculture, 1924
SR Serbia	88361	65 980 000	747	1: 100 000	Dukić, 1978
Data obtained from digital data sources					
Serbia	88496	21 982 000	248	1: 500 000	Data base of GIJC SASA
Serbia	88496	28 548 000	323	1: 300 000	Data base of GIJC SASA

*In all mentioned sources measurements of river network length were carried out, except for Dukić (1978) in which their estimation is provided. The densities of river network were calculated by the authors of this article based on river network length data and area of the territory to which they relate.

For the purposes of the *“Catalogue of rivers in the Federal Republic of Yugoslavia”*, which was compiled by the Federal Hydrometeorological Service in 1995, the data from the *“Inventory”* in 1924 were taken. The catalogue

is updated with the data which is mainly related to the canal network in Vojvodina, and contains only their names and codes, not the data on their lengths. Therefore it can be concluded that this catalogue does not bring a new quality of data in terms of length and density of the river network.

Unlike measurements, which, depending on the size of the territory and the map scale used, may be time consuming procedures, estimates are the other way to acquire the data. Dukić (1978) assessed the length of the river network in Serbia, and then using the estimated value calculated its density. The methodology used is described by Dukić (1958). On the basis of the measured length of the river network in the basins of the Ibar, Lim, Pek and Sava to the mouth of Krka from maps scale of 1: 100 000 it has been calculated that the DRN in the basin with normal erosion (no wind and no karst) cannot be less than 700 m/km², in areas with wind erosion least 75 m/km², and the karst terrain with 50 m/km². Based on these densities and areas with the prevailing type of erosion the total length of rivers in Serbia is estimated, and then the DRN in Serbia (Table 1). This value of estimated DRN in Serbia is cited in geographical literature until today.

Printed maps were used as the basis for obtaining data on length of the river and areas in previous measurements. Production of digital maps in Serbia began at the end of the twentieth century. One of the first applications of computers was in cartography. The benefit of storing cartographical data in a computer, easy access to necessary changes in them, preparing for publication and printing of up-to-date maps, introduced computers in cartography. The next phase was to use the computer to store cartographic data (formation of geodatabase) and to review them. Cartographic data can be stored in the raster and vector form. The vector format allows the automatic calculation of the length and area of individual elements. Watercourses are presented in the vector format, so the accuracy of the obtained data on the watercourse length is only influenced by the method of conversion of watercourse data to the vector format. The authors of this article had available data of river network in vector format, which were created by converting the data from analog maps scale of 1: 500 000 and 1: 300 000.

PROBLEMS OF DETERMINING THE DENSITY OF RIVER NETWORK

During the research of determining the DRN two groups of problems were defined; the first one refers to the theoretical assumptions and the other is related to the practical problems of calculating the DRN. Some of them were and still stand today, while some have been overcome.

The first group of problems is related to the definition of river network. The river network is one of those terms where the definition seems simple at first sight, but it involves a few terms that require more detailed determination. They can be divided into two groups: those related to: 1) the definition of watercourses on the basis of which DRN will be calculated and 2) problems related to the surface area (territory) for which DRN is calculated.

- 1) The first problem involves the definition of the type of watercourses that makes up the river network which will be used as an input parameter for calculating the DRN. Everyone agrees that it consists of natural watercourses, but some differ among the permanent, periodic and occasional. Accordingly, it follows that it is possible to calculate the DRN for each of these watercourse types. One of the conditions to determine which watercourses form river network can be their length. This requirement is already applied in determining which watercourses will be mapped. Guidance for making maps scale of 1:25 000 can serve as an example. It provides that only watercourses greater than 250 m should be mapped. In general, the smaller the map scale is, the smaller is the number of watercourses which will be mapped.

In addition to these conditions, we believe that it is possible to take some other characteristics of watercourse as a requirement, such as the average water discharge. This implies that it is possible to calculate the different DRN depending on the purpose of research. If all watercourses are accounted for in a river network, then it could be defined as the *general density of river network*, while a river network that constitutes of selected watercourses by some criteria could be referred to as a *specific density of river network* (see Figure 1).

- 2) Problems related to surface area for which DRN is calculated are related to administrative borders, while at the natural boundaries (basins boundary) they do not exist. Namely, when determining the DRN of a river system, which is the main river with its tributaries, that is all the rivers that belong to a basin, there are no problems related to border watercourses. This is also pointed out by Cvijić (1901). The problem arises when calculating the DRN of some administrative territory, which borders may constitute of watercourse. Each administrative territory certainly uses bordering watercourse for some purpose and it is right to include that watercourse when calculating the length and DRN.

Researchers who determined the length of river network in Serbia, such as Cvijić and colleagues in 1901 and the Ministry of Agricul-

ture and Water in 1924, did not deal with these theoretical problems. Definitions of river network and the procedure for calculating its density, by Neuman and Horton, appear in textbooks and papers of Jevđević (1956) and Dukić (1958, 1962).

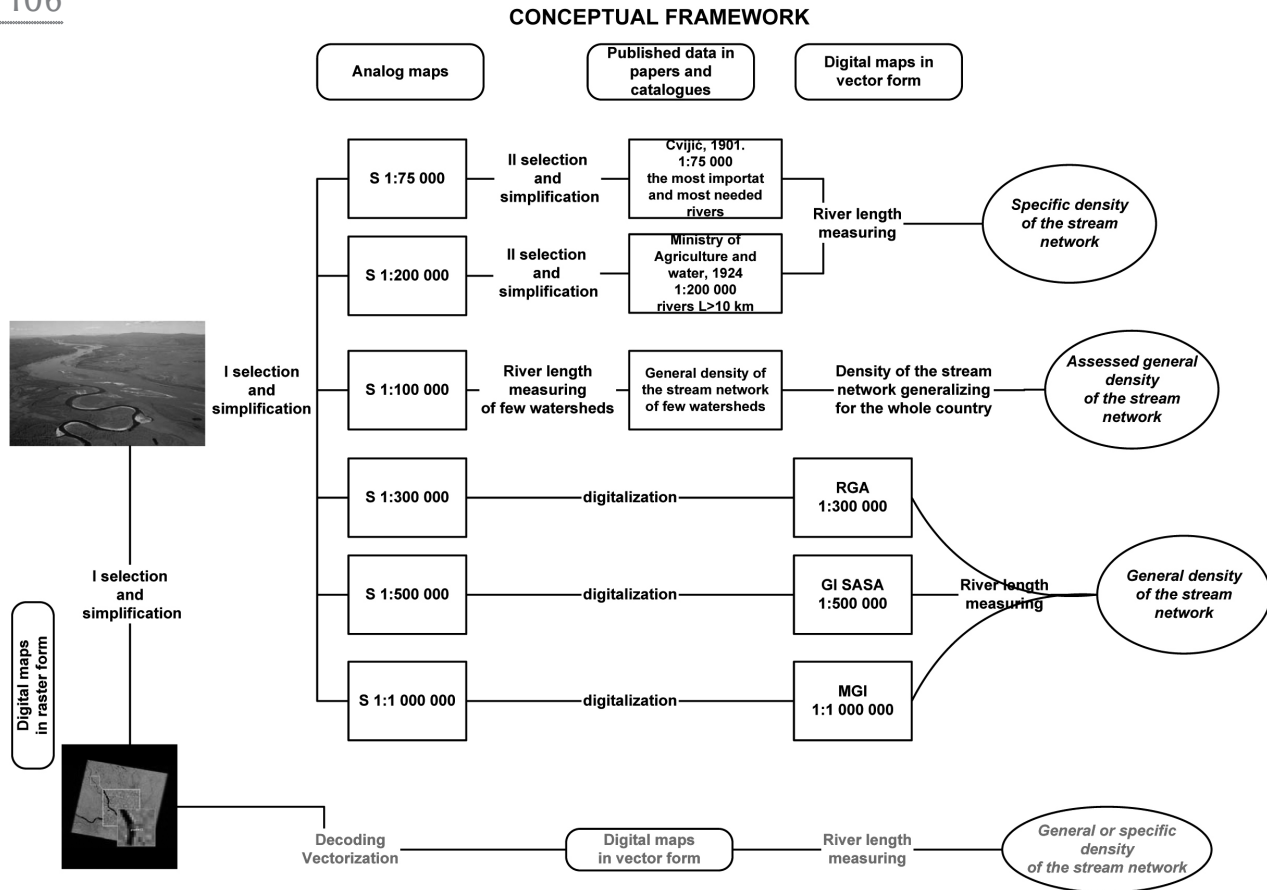


Fig. 1. Conceptual framework of determination of river network density

The second group of problems is related to practical problems of calculating the DRN. They could be divided also in two groups: 1) group of problems related to the data source, and 2) a group of problems related to the measurement of the map content.

Maps are used as sources of data for calculating the DRN. During the map drafting the content to be mapped is determined. It can be said that the map content does not reflect fully the situation on the ground. The difference between the situation on the ground and the one on the map depends on the adopted scale in which the map will be created. The

smaller the selected scale is, more details will be omitted and the mapped details will undergo a greater degree of generalization of the shape. This also applies to watercourses. The maps show only watercourses that meet certain conditions and display of their flow is generalized (Figure 2).

In papers of Cvijić and the Inventory of Department of Agriculture and Water, there is another selection - a generalization. In the process of publishing, a selection was made by the criterion of "the most important and most necessary" in Cvijić work and longer than 10 km when it comes to the Inventory of the Ministry of Agriculture and Water, or Catalogue of Federal Hydrometeorological Service. In both cases, on the maps used for measurements, more watercourses were mapped, which means that not all the data on river length were published. The published data on the length of the river network can be used to calculate the DRN, with the explanation that this is a specific DRN, which is calculated based on the selected data according to some criterion.

In order to eliminate the problems arising by the application of the first selection, many authors who researched DRN consider it necessary to use larger scale maps. For the territory of Serbia it is recommended to use topographic maps 1:50 000 and larger (Prohaska, 2003; Živković, 1995), because the values obtained from smaller scale maps are less than real. In this way the focus is transferred from the problem of meaning and importance of the DRN to the problem of its detail. Therefore the level of detail representative when talking about the DRN of some territory has become a common issue. Nevertheless, there is no answer to that question that could be supported by appropriate arguments. Solution should be looked for in renewed emphasis on the core issue, and that is the meaning of the length and density of river network. If the density of a river network should represent water drainage from an area and needs to be displayed in the greatest possible detail, it is necessary to use the pertinent source of information (large scale maps with high level of detail) – *general DRN*. If we need the DRN for water management (hydropower sector, navigation), then we need the DRN made up of watercourses that have other characteristics, namely that have been selected by an additional criterion (the amount of water, width of watercourses) – *specific DRN*. Therefore, map scale is important for the determination of length and density of river network, but the decision will be made depending on the purpose (goal) for which it is needed. Accordingly, it could be concluded that the general DRN, carrying information only about the length of river network, has relatively little informative value, while the specific DRN, which is determined on the basis of other criteria (for example, water discharges, significant or not for certain purposes) has a greater informative value.

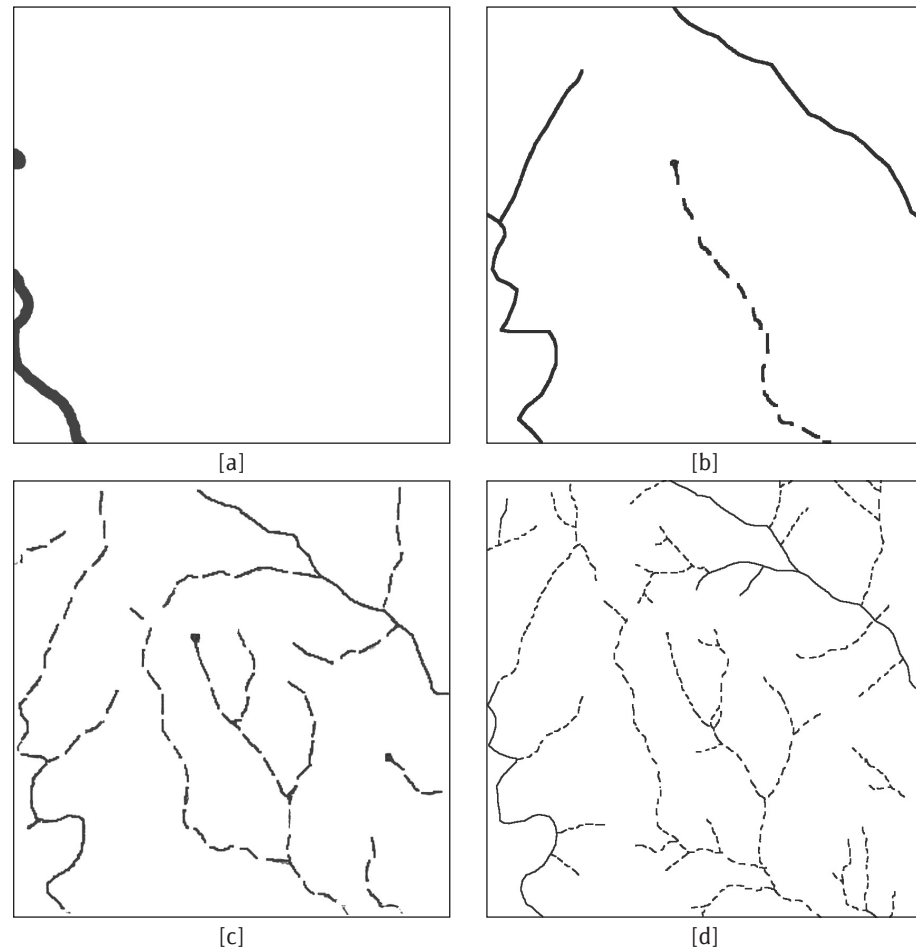


Fig. 2. River network of the same area (2 x 2 km) on maps of different scales
a) 1:300000, b) 1:100000, c) 1:50000, d) 1:25000

Nowadays (the era of digital maps) data generalization is relatively small on raster maps obtained from satellite, aerial and radar images. Different software can make it automatically. However, the biggest problem with these data sources is the decoding problem (classification of water bodies that are captured on images) and their vectorization (see Figure 1).

A group of problems related to the measurement of contents on map, can refer to the method and accuracy of instruments used for measurements. The accuracy of measurement used to be a significant problem. It depended on the accuracy of instruments which were used for measurement (curvimeters and planimeters). Today this problem has been re-

solved. Lengths are determined by distance between the points for which coordinates are known and software calculates them automatically. This ensures that errors are kept to the minimum.

CONCLUSION

This research has shown that it is necessary to differentiate between two types of DRN. The first one is DNR calculated on the basis of all water-courses of a specific area and it could be called the general DRN. Closest to it is value of DRN obtained from maps of large scale – high detail. All other types of DRN should be treated as specific DRN. During calculation of DRN it is important to know for what purpose DRN value will be used.

In terms of informative value, the general DRN has less informative value than the specific DRN. The use of only general DRN as a DRN parameter is not sufficient. There is a need to define standard types of specific DRN and utilize them. Future research should be focused in that direction.

ACKNOWLEDGEMENTS: The study is a result of research carried out within the scope of the project no. 47007 funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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IMPACT OF CVIJIĆ ON SLOVENE KARSTOLOGY AND GEOMORPHOLOGY

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ABSTRACT: The first book published in the Slovene language to be justifiably considered to deal with karst and to be specifically related to geomorphology is *Kraški svet in njegovi pojavi* (Karst terrain and its phenomena) written by Pavel Kunaver in 1922. Neither the Kunaver book nor the description of Cerknjško jezero published by M. Kabaj (1925) contain any references, but again in the texts Jovan Cvijić is mentioned as “our” scholar trying to explain particularities of this seasonal karst lake. In this paper there are altogether 39 chosen Slovene publications ranging from the already mentioned Kunaver work, over a contemporary textbook of karst physical geography and all the way to a chapter on closed depressions in a sort of encyclopaedia of geomorphology. These 39 publications were written by 13 different authors. All these works cite 34 different publications by Cvijić. The most frequently (19 publications) cited work by Cvijić is *Das Karstphänomen* (1893), followed by *Karst* (1895) in the Serbian language. Frequently are also cited his *Geomorfologija* (parts I and II) published in 1924 and 1926, 8 times in total, and *La géographie des terrains calcaires* (1960) as well as *O snežaničkoj i ledničkoj eroziji* (1922), both cited five times. 15 publications by Cvijić are cited 2 to 4 times, whereas 14 of his works are cited just once. Cvijić was cited the most by A. Melik and I. Gams. A decreasing trend is noted in the number of Cvijić citations from older towards younger generations of the Slovenian geomorphologists.

Key words: karst geomorphology, karst terminology, Cvijić Jovan, Slovenia

INTRODUCTION

The primary purpose of this short review on physico-geographical, geomorphological and karstological works of Slovene authors is to find out who, how many times, and which of Cvijić’s works on karst they are citing.

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The secondary objective is to review the works by Cvijić used by the Slovene authors as references in their investigations. The third and the most important goal of this paper is the attempt to evaluate which of works by Cvijić, which of his ideas, and which of his topics are the most appreciated by our researchers in karst. Special attention will be paid to the impact Cvijić had on the karst terminology in general and on the Slovene karst terminology, in particular.

Between the times of the publication of the basic work *Karstphänomen* (1893) by Cvijić and the end of the WW I not a single Slovene geomorphologist has been occupied with karst research and there were no publications related to this topic in the Slovene language at all. Relatively numerous descriptions of the region being nowadays Slovenia have existed, especially publications by Slovenska matica under the title "*Slovenska zemlja*" (Land of Slovenia): *Trst (Trieste) in Istra* (1896), *Beneška (Venetian) Slovenija* (1899), and *Cerkniško jezero* (The Lake of Cerknica) (1898). These works contain descriptions of landscape, karst land and karst phenomena included, but terminology used therein differs widely from the modern one; besides neither Cvijić, nor his works, are mentioned. J. Žerovnik, the author of *Cerkniško jezero* book mentioned above used for the land formation now known as "doline" the local expression "ograda". Similarly to the other branches of science, also physical geography and geomorphology have got a decisive impulse upon the foundation of the university at Ljubljana in 1919 (Universitas Labacensis). The first book published in the Slovene language to be justifiably considered to deal with karst and to be specifically related to geomorphology is *Kraški svet in njegovi pojavi* (Karst terrain and its phenomena) authored by Pavel Kunaver in 1922. P. Kunaver was the teacher of geography and studied at Vienna exactly 20 years after the doctoral thesis of Cvijić was published. The book of Kunaver was in fact a popular one and not a scientific book; consequently it contains no citations and also no references. But in the text Kunaver mentions Cvijić several times, he mentions his epochal work *Das Karstphänomen*, he summarizes the theories Cvijić has developed on the formation of dolines and he even uses an illustration by Cvijić, namely his cross-section of a doline. For a karst form doline Kunaver uses Slovene word dolina (from which the international term has been derived) and not "vrtača" which was introduced to Serbian language by Cvijić and soon adopted by the Slovene geographers as well. Like Kunaver also the description of Cerkniško jezero published by M. Kabaj (1925) does not contain references but again in its text Jovan Cvijić is mentioned as "our" scholar trying to explain particularities of this seasonal karst lake.

CVIJIĆ'S WORKS IN SLOVENE KARSTOLOGY

To comprehensively describe the impact of Cvijić as proposed in the title of this paper I have made an overview of the published works on karst authored by Slovene geomorphologists to find if they cite Cvijić works and which ones. To see the trend of citations I compared older papers, defined as papers published during the first ten years of the appearance of the two journals: *Geografski vestnik* (Slovene Geographical Bulletin) and *Acta carsologica*, with the papers published during the last ten years (2003–2014) in the same journals.

From various Slovene books and articles treating karst geomorphology in the broadest sense of the word I have chosen only some of those that have cited works by Cvijić. Of course the choice is personal but at the same time I am quite convinced that it represents relatively a good portion of Slovene karstological works. It is obvious that I cannot say how large is this representative sample in regard to the complete bibliography of Slovene karst geomorphology. The main reason is that we do not have such a bibliography. Altogether there are 39 chosen publications ranging from the already mentioned Kunaver work from 1922, over a contemporary textbook of karst physical geography (Stepišnik, 2011) and all the way to a chapter on closed depressions in a sort of encyclopaedia of geomorphology (Kranjc, 2013). These 39 publications were written by only 13 different authors, therefore demonstrating that karst geomorphology researchers were not and are still not numerous in Slovenia. These works altogether contain 34 cited publications of Cvijić, while two of them mention and use Cvijić's statements in text without reference to the source. Out of the whole bibliography of Cvijić the segment related only to the topics of terminology, karst, glacial period, morphology, tectonics and geology contains 102 items (Milojević *et al.*, 2000); out of these 102 items only 34 works have been cited (see above). This means that just one third of all applicable publications have been cited. Even though, it can be stated that publications by Cvijić are relatively well known and well used in Slovene works on karst geomorphology. The most frequently (in 19 publications) cited among the works by Cvijić is *Das Karstphänomen* (1893), followed by *Karst* (1895) in Serbian language. Frequently are also cited his *Geomorfologija* (in two parts, I and II) published in 1924 and 1926, 8 times in total, and *La géographie des terrains calcaires* (1960) as well as *O snežaničkoj i ledničkoj eroziji* (1922), both cited five times. 15 of publications by Cvijić are cited 2 to 4 times, whereas 14 of his works are cited just once.

Looking more in detail it seems that the trend of citing Cvijić is decreas-

ing. Illustrative examples are works of A. Melik and I. Gams. Among older authors, such as is Anton Melik (1890–1966), he is an outstanding figure without any doubt. In 1927 he was employed as a teacher of geography at Ljubljana University and his goal was to prepare and publish an extensive treatise on geography of Slovenia. Between the years 1935 and 1963 he published this work as seven large volumes, totalling a few 1000 pages. In his book *Slovenija I, Geografski opis* (Geographical description) Melik (1935) cites 25 various publications written by Cvijić. Two references out of these 25 were used in the geological-tectonical introduction, in the geomorphological description five, one in the chapter on the transformation of the surface in the Diluvium, and for the description of the karst part of Slovenia he cites even 11 works of Cvijić. The most important of these works is *Das Karstphänomen* (1893). Taking into the account all of the chapters of the *Slovenija I, Geografski opis* by Melik, a little more than 5% of all of the references belong to Cvijić. On the other hand, in the chapter on karst in this book, even one quarter of the references belong to Cvijić. In the second edition of *Slovenija I* (1963), in other respects well reworked and supplemented by new data among the references there are only three publications of Cvijić remaining, *Das Karstphänomen* (1893), *Glacijalne i morfološke studije o planinama...* (1899 and 1900), and *Hydrographie souterraine...* (1918). Without doubt the main reason for the decrease of citations of works by Cvijić is the fact that Melik is referring to the first edition of his *Slovenija I* (1935) where there is, if I may say so, the complete list of works by Cvijić.

From the next generation the Nestor of Slovene karstologists Ivan Gams (1923–2013) has to be mentioned. It would be a too lengthy paper to detail all of his geomorphological publications, in the Slovene bibliographical system COBISS he has over 1,200 entries. Similarly to Melik, but far more focused on the karst, he published two books on karst: in 1974 the title *Karst - history, natural history, and geography* (in Slovene) containing 360 pages and in 2004 *Karst in Slovenia in place and time* (in Slovene as well) having more than 500 pages. Not so often as Melik, but still significantly, in these two books he cites 9 works of Cvijić.

Between the 1st and the 2nd World War there have been only seven works published that are citing Cvijić, but among these are works which had the largest number of citations of his publications, among these being *Slovenija I* (1935) by Melik as the first one. There have been relatively many of adequate Slovene publications issued after 1990, but the number of works by Cvijić that are being cited in them is much smaller than in the past. Comparing papers of the journal *Acta carsologica* from the first 10 volumes (1955-1982) with the last 10 volumes (2004–2014) there is not a

large difference: from the first 10-year-period there were 26 papers of Slovene authors and five of them are citing publications of Cvijić, while from the last 10-year-period there are 18 papers and three of them are citing Cvijić. Analysis of the papers published in *Geografski vestnik* (Geographical Bulletin) shows a different picture. During the first period (1925–1934) nine papers adequate for this investigation have been published and 4 of them include Cvijić among the references. During the years 2003–2014 there are 8 papers including karst geomorphology and only one of them cites just one work of Cvijić. I do not have well founded proofs that the popularity of works by Cvijić among the Slovene geomorphologists is diminishing and that among the references they are publishing there are less and less works of Cvijić, but I believe that this is not far away from truth. A good example can be the book *Slovenija pokrajine in ljudje* (Slovenia, lands and people) (Perko & Orožen Adamič, 1998) published on 735 pages of large format and which is colloquial by geographers often called “The Second Melik”. Among the almost of 1,300 references there is not a single one of Cvijić, whereas the “real” Melik (1935) cites 25 publications of Cvijić. Another reason is that the recent papers are more and more specialised and therefore they are citing just the works directly touching their problem.

CONCLUSION

The most difficult task is to evaluate the impact of works by Cvijić on Slovene researchers and writers regarding karst geomorphology. In the papers accompanying *Slovene karst terminology* (Gams, 1973b) there are also papers, one on the term “karst” and the other one on the terminology of close depressions (Gams, 1973; 1973a). In both of these papers there are not only references of Cvijić but also his views and his introduction on the term “vrtača” for “doline” in Serbian language being well explained, too. But surprisingly among the references of the *Terminology* part Cvijić does not figure. In the above mentioned paper (Gams, 1973) it is also explained how the term “vrtača” entered Slovene karst terminology following the example of Cvijić. Quite the same was with the term “uvala”. In Slovenia we adopted it and actually use it as well (Kranjc, 2000; Frelj, 2001) while some foreign authors proposed to discontinue the use of this term in the international karstological terminology as is well explained in the doctoral thesis of J. Čalić (2009). A. Melik (1935; 1963) is explaining theories of Cvijić on the origin of poljes, on the genetically connected forms doline-uvala-polje, his opinion upon karst groundwater and the introduction of the term “hum”.

Gams is sometimes using explanations and definitions of Cvijić, for example Cvijić's definition of karst (Gams, 1973), whereas some of his works are using publications of Cvijić more from the historical point of view. It is self-understanding that the youngest generation of Slovene karst researchers cites Cvijić less and less. Modern views upon the morphogenesis of karst forms and upon the cycle of karst development are quite different from those developed by Cvijić. Special papers nowadays focus upon narrow phenomenon or a single process and are consequently citing just the works which are directly touching their research question. The terms doline, uvala, polje are so familiar that normally we do not think upon their origin and upon their development and therefore we do not need to cite Cvijić. Therefore, in the recent time works by Cvijić are cited most often from their historical point of view. Cvijić played an important part in the development of karst science and in the development of karst terminology in particular, a much more important role than most of us is thinking nowadays. But his importance is regarded more and more from the historical point of view and most of the authors are now in reality citing his works without having a look into his publications, which is already clearly evident from the short and incomplete review of Slovene publications on karst geomorphology described herein.

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BEGINNINGS AND FOLLOW-UP OF KARSTOLOGY KNOWLEDGE TRANSFER ON TWO DINARIC KARST EXAMPLES

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ABSTRACT: This work deals with issues relating to karst in which Jovan Cvijić had a prominent or leading role on two levels. The first level concerns issues of karstology as a science of karst, i.e. the contemporary perception of karstology. It significantly broadens the area of karst researchers' responsibility in comparison with Cvijić's time, but also with regard to the generally accepted ethical dimension of science until the end of the twentieth century. The earlier understanding required the researchers to systematically investigate and interpret karst. The contemporary view, influenced by different paradigms like environmental, systematic, bioethical or holistic, adds the responsibility to confirm this knowledge in the social reality. The latter, in this light, follows the development and future of karstology information on two extraordinarily valuable karst phenomena: Vjetrenica cave in Popovo polje (Bosnia and Herzegovina) and the cavern system of Ombla (Croatia and BiH). Perceptions of Vjetrenica and Ombla changed over the course of time, partly due to dissemination of scientific information, and partly due to tradition, world views and the current social circumstances. The fact that Vjetrenica and Ombla are the subterranean karst phenomena had a different meaning for these caves during the different stages. Because of this key fact, they both grew to become very obvious public symbols, but their fate, the way how they are used, differs.

Key words: karstology, Jovan Cvijić, transfer of knowledge, Vjetrenica, Ombla

INTRODUCTION

In this work, we will review the issues regarding karst in which Jovan Cvijić, during his research, had a prominent or leading role. The first issue concerns problems of karstology as a science about karst, namely its contem-

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porary definition, and the second one follows the type, development and public reception of karstology information about the two extraordinary valuable karst phenomena: Vjetrenica cave in Popovo polje (Bosnia and Herzegovina) and the cavern system of Ombla (Croatia and BiH).

In the beginning, in mid-19th century, karst was first defined as a rocky desert-like landscape. Then, caves were included and later on, also the poljes, blind valleys, karst lakes etc. In the end of 19th century, Cvijić connected these phenomena, which different professions marked as karst, and pointed to the complexity of karst (Gams, 2004, 24). He thus set the foundations for the development of karstology, and in that sense, performed pioneer work in this field (Roglić, 1982). Over 120 years passed since, but karstology, although in charge for 1/5 of the global land, rarely managed to impose itself as an independent scientific discipline.

At the age when karstology was formed, the prevailing concept was that of modernism. It was characterized by the accumulation of power, continuous technological advances, development of economy-induced science, politics that promotes growth and bases its power on it, and similar phenomena (Giddens, 2007, 44–45). Most of these modernist endeavours were fulfilled in the construction of national states.

In the end of 20th century, people started to lose faith in science, technology and rational planning, and started to doubt big bureaucratic systems. People were becoming aware of the harmful effects of pollution, and they started turning to nature and to forgotten spirituality or to new one. (Haralambos & Holborn, 2002, 9). Holistic and environmental paradigms are gaining strength in the science field, and they are expanding responsibility from a purely scientific approach to the application of the knowledge in everyday life.

One of the consequences is knowledge transfer, which creators of knowledge undertake in order to ease and increase its usability (Perera, Buse, & Crow, 2006). This work will use the knowledge transfer model that was created in the forest landscape ecology of North America in order to show the recent faith of information about Vjetrenica and Ombla.

CVIJIĆ AND DEVELOPMENT OF KARST RESEARCH OF POPOVO POLJE

Vjetrenica and Ombla are connected by Popovo polje, which Cvijić considered to be “the purest type of blind valley” (1950, p. 3), and said of its wider surrounding that “there is no deeper and more wholesome karst” (1926, 434).

He pointed to its dry vallies, Vjetrenica cave, hums etc. These hums in Površ karst plain, which belong to Popovo polje valley, he described as *locus typicus* phenomenon.

Cvijić put focus of “the first systematic research of speleological conditions of a larger area of Dinaric karst” (Milojević, 1928b) and the first big task of the Speleological section to Popovo polje. At least 28 speleological facilities were researched between 1925 and 1928. Out of 13 scientific papers published by the members of the section in the *Bulletin of the Serbian Geographical Society* by 1930, 10 referred to Popovo polje.

The aim of the survey of Popovo polje was to obtain a concrete study of hydrographical base for agricultural land amelioration (Milojević, 1928a), but also to make a contribution to the science itself. Cvijić, with this research, “tore down the wall which fenced our science from the life of our society” (Milojević, 1951, 106). Some results of this survey were first published in Cvijić’s *Geomorphology II*.

SPELEOLOGICAL RESEARCH OF VJETRENICA AND OMBLA

Vjetrenica and Ombla are both distinctive karst phenomena that marked the space during the course of history in a significant way. Speleological research were conducted in different historical times and thus caused different perception of these phenomena. Nikola Gučetić (1584) explores the reasons for the existence of the wind in Vjetrenica within natural philosophy, but the modern research began in the late 19th century and in several more intense waves continue to this day.

Karel Absolon (1916) considered Vjetrenica to be one of the biggest and most remarkable caves in the world, in which several streams flowed in different directions and at different heights, “which is relevant for creation of theory of karst hydrography”. With this research, which Absolon considered to be one of the most difficult in the world, precisely in Vjetrenica, he “set benchmarks for research of limestone of the Balkans karst”.

Cvijić entrusted his assistant Mihajlo Radovanović with detailed research and analysis of Vjetrenica, and Radovanović defends his doctoral thesis on it in 1928. In 1929, Radovanović published this thesis in the form of monography, with a complete and detailed plan of the cave and with photographs done by Čedomilj Kušević.

Sima Milojević (1938) opposed to the former dominant perception on hydrographic function of Vjetrenica as a drain of Trebišnjica or Popovo polje, and concluded that it is a tributary of Popovo polje. Later re-

searchers Orhan Zubčević and Ratimir Gašparović (1958) agreed with this opinion. A new series of research was conducted by speleologists from several clubs in Croatia, Bosnia and Herzegovina and other countries between 2000 and 2009. These studies yielded several scientific and popular works, concluding with an extensive encyclopaedic entry, and proved that Vjetrenica is the world's richest cave when it comes to subterranean fauna (Ozimec & Lučić, 2011).

Research of Ombla as subterranean karst phenomena was first conducted in order to map subterranean connections of its ponors with the source. After four unsuccessful attempts since 1880, Cvijić's associates, members of Speleological section, succeeded on 12th October 1926 (Lazić, 1926, 137). One of the unsuccessful attempts was led by Karl Absolon, for whom Ombla was a synonym for Trebišnjica and who considered it to be the world's greatest subterranean river (1916).

Modern, by the methods, means and scope unseen before, research of Ombla was underway from 1960s to 1980s, within the project for construction of hydropower plant on Trebišnjica, and later within the project of Ombla hydropower plant. Stjepan Mikulec was the first who took care of hydrogeological aspects of these studies (1965), and was then followed by Petar Milanović who synthesized and published the results of the research several times (1979, 1999, 2006).

Direct speleological study of Ombla was first concentrated to Vilin stan, in the 1950s (Malez, 1970). In the second half of 1980s, they are extended to the lower levels, i.e., to Ombla, and connect the two phenomena in a single system with three levels, which has so far been explored to the total length of 3063 metres. In the past seven years, research was concentrated on biospeleology, as a ground for introduction of Ombla to the National ecological network, which, after the Croatia's entry to the EU, became Natura 2000 (Ozimec et al., 2012). Information that affirms Ombla as the richest system when it comes to subterranean fauna in Croatia was also gathered.

PUBLIC PERCEPTION AND USE OF VJETRENICA AND OMBLA

Public perception and use of Vjetrenica and Ombla are a consequence of different historical understanding since ancient times and of extensive modern exploration of those cave systems. In the public perception, Vjetrenica never ceased to be a mythological phenomenon. On the other side, Ombla became a caving phenomenon only recently.

Vjetrenica became a matter of myths mostly because of its length and end. It is estimated to be more than 20 kilometres long and that it ends on the Dubrovnik island of Šipan. Until now, it is discovered in total length of 7 km. The most prominent researchers are partly to blame for this “mythological” image which is still conveyed by tourist guides. Absolon (1916) claimed that Vjetrenica was the largest cave in the world and Radovanović (1927) that it was “the largest cave in our country”. Cvijić encouraged ethnographic research of Popovo polje, which was conducted much later by Ljubo Mićević (1952). Mićević, again in cooperation with the members of the Speleological section, built a tourist pathway in Vjetrenica between the two wars, and he personally acted as a travel guide. After World War II Vjetrenica was further adapted for tourists and illuminated, but it lacked the proper management or marketing. In the early 1990s, Vjetrenica found itself in a war zone. The equipment for tourists was destroyed and the cave itself completely neglected (Lučić, 1999).

On the other hand, in the social sciences and humanities, due to their positivistic framework, the generative cultural role of Vjetrenica was never properly explained. They still attribute this role to its nearby historical responses, the Catholic church of St. Peter and the Orthodox monastery of Presentation of Mary.

Ombla has been an exceptionally attractive area ever since the Middle Ages. The Dubrovnik aristocracy in the Renaissance used it as a resort, and numerous summer residencies, villas, were built around Ombla. It was a subject of numerous travelogues and an extraordinary resort. It became the model for the first Dubrovnik pastoral literature (Bogišić, 1989). The most important researches of the 19th century have studied Ombla, and these studies were concentrated exclusively on the ground, i.e., on flora and fauna. Ombla underworld finally enters the mountaineering literature between the two wars in the 20th century (Kusijanović, 1929), at first thanks to the cave above the spring, Vilin stan. During the 20th century, the villas were increasingly dilapidating, especially after the construction of the Adriatic road in 1963, and the new economic landscape of Rijeka Dubrovačka, with new residential neighbourhoods, has strengthened. Today, in the Dubrovnik jargon, Ombla almost exclusively means the river source, without consciousness of its underground world, and Rijeka means a geographical area. Even in one of the most recent studies on homeland perception of space of Rijeka Dubrovačka (Matuško, 2014), Ombla is generally referred to as a river course, sometimes as its source.

These two caves, Vjetrenica as a protected tourist cave, and Ombla as a protected landscape and a water source, and most recently also as

part of the Ecological network Natura 2000 "Ombla-Paleombla", became the objects of a planned economic intervention, to which part of the public opposed. In order to protect them, knowledge transfer from scholarly sources to the general public was started.

KNOWLEDGE TRANSFER AND ITS RESULTS CONSIDERING VJETRENICA AND OMBLA PROTECTION

There are five factors through which literature (Perera et al., 2006) perceives the transfer of knowledge – scientific research which produces knowledge, the potential for its application, users of the knowledge, ability of infrastructure to transfer the knowledge and the very process by which the transfer is achieved. We will concentrate mainly to the first and the last factors.

In terms of PRODUCTION OF KARST KNOWLEDGE, with regard to the Dinaric karst, there are very few study programs, institutes and magazines that are strictly focused on the karst. They include the post-graduate studies at Nova Gorica University, the Institute for Karst Research in Postojna and the Institute for Adriatic Crops and Karst Reclamation in Split. The magazines/journals are *Acta carsologica* published by the Institute for Karst Research in Postojna and *Naš krš* published in Sarajevo. There are, however, numerous study programs, institutes and journals from various geoscience fields, which deal with specific aspects of karst and probably have greater overall production, but they are not visible through karstology programs.

Poor visibility of karstology is confirmed by the low frequency of its name ("karstologija"/"karstology") in the national library bases of the countries of the Dinaric karst. According to a query from September 2013 (Lučić, 2014), the Slovenian national base Cobiss.si, recorded those keywords 3139/2083 times, the Croatian base crosbi.irb.hr 3/242 times, Bosnia and Herzegovinian base cobiss.ba 0/0 times, Serbian base cobiss.sr 0/3 times and the Montenegrin base cobiss.cg 0/1 times. The visibility is further diminished because of the insufficient emancipation of karstology among the professional staff in the libraries, so karstology works get classified under various other disciplines or topographical phenomena.

When the search variable of knowledge transfer is added to the karstology terms, there are no responses to the queries. The situation is slightly better when the two bases of the countries which have Vjetrenica and Ombla are searched solely by keywords "transfer" and "knowledge". The search engine of the National and University Library of Croatia (NSK) for the last 10 years finds the total of 200 units which contain "transfer"

as one of the key words. Among them, 32 refer to various aspects of the transfer of knowledge. They include 7 PhDs (3 in economics and one in political science, literary theory, information sciences and kinesiology), and 25 articles in journals (3 in economics, at 2 in literary theory, anthropology, information science, etc.). The base cobiss.ba contains 173 units responding to the keyword "transfer", and three on the joint inquiry with the key words "transfer" and "knowledge" in the last ten years. They include a master thesis and a monography in economics and a report from a political theory panel. So, once the scientific knowledge is produced, there is rarely and additional care about its future and it rarely becomes an object of a meaningful knowledge transfer to the public and the end users.

The POTENTIAL FOR APPLICABILITY of karstology knowledge is growing every day in accordance with the increasing role of environment protection in the management of nature and the environment. The example of forest landscape ecology in North America shows that it is growing due to the expanding objectives of forest management and because of shifting of the focus from exploitation and delivery of wood to the much more complex goals of regional sustainability of natural resources (Perera et al., 2006, 5). The LIST OF USERS OF THIS KNOWLEDGE spreads from the decision makers, legislators, managers and business partners to the audience and stakeholders, who may be recreational, conservationists, tourist industry officials, citizens' associations, environmental non-governmental organizations, etc. Namely, the demands and engagement of stakeholders played the key role in our knowledge transfer. With Vjetrenica, those were activists and speleologists gathered around Speleological Society Vjetrenica – Popovo polje, and with Ombla activists of Zelena Akcija and Civic Initiatives Srđ je naš, Eko-Omblići and Spasimo Omblu i njezine stanovnike.

The ABILITY OF INFRASTRUCTURE to enable the transfer of knowledge increases by the day, in accordance with technical progress, development of satellite communication, Internet, widely accessible databases, digital formats for storage and delivery of information and their placing at the disposition of the public through printed and electronic media and Internet portals. However, in most countries of the Dinaric karst, it faces huge obstacles due to the lack of key databases, such as cadastre of caves or other karst phenomena.

Social circumstances surrounding Vjetrenica and Ombla dictated the type of transfer of knowledge characteristic of activist actions. This knowledge transfer was significantly marked by a fierce public debate, which proved to be useful for attracting public attention and dissemination of information. The main aim of the transfer was to provide the wider public

with a more complex and a more complete knowledge of that significantly reduced one, which was offered by the official and administrative bodies.

THE COURSE OF THE KNOWLEDGE TRANSFER about Vjetrenica can be traced between from 2000 to 2009. It was a part of a volunteer project research, popularization, use and protection of Vjetrenica which was left unprotected and damaged after the 1991–1995 war. A week-long research camps led by Speleologic club Velebit which would gather up to 70 participants were organized every year. Special research like excavation of leopard and cave bears skeletons were organized, as well as other actions: setting up of research equipment, preparation of plans for decoration etc. Popular events on the occasion of Mother Earth Day on April 22, round table discussions and public lectures were also organized.

These events provoked great public interest and received coverage by the newspapers, radio and television. Two films were also made. A monograph (see: Lučić, 2003) and fifteen scientific and expert papers were published on the subject. In addition, at least 240 articles appeared in 430 publications in printed media and on Internet portals between 1999 and 2007 (some of them were press releases or agency articles appropriated by other publications).

The research received institutional support from the Academy of Sciences and Arts of Bosnia and Herzegovina (ANUBiH), which, riding the wave of these activities, established its Centre for Karst. ANUBiH has affirmed the idea of enrolment of Vjetrenica on the UNESCO World Heritage List, and in 2004 it launched an action by entering Vjetrenica to the Tentative list.

In the post-war period, the BiH public institutions did not function well, especially when environment protection is concerned. Thus, only the local authorities showed some interest in Vjetrenica. However, it was not in order to protect it – the local authorities even boycotted the UNESCO action – but perceived Vjetrenica as an economic resource which they wanted to have under control. The petition to preserve Vjetrenica, signed by more than four thousand people including the most prominent names in the field of nature protection and karstology on the local and global levels, had no impact on its fate. This is an example in which transfer of a credible knowledge lacked a fertile soil (Ekoakcija, 2009a, 2009b, 2009c, 2009d).

A request for realization of a project for construction of an underground hydroelectric power plant revealed the speleological dimension of Ombla and launched the most comprehensive knowledge transfer in speleology in Croatia. The environmental impact study for Ombla HPP, which was adopted and came to effect in 1999, presented the Ombla HPP as a

financially and environmentally sustainable project. It portrayed this particular cave system as an area without threatened and endangered species. This study was a great test for the government of the time (Brailo, 2012).

Since the investor of Ombla HPP requested a loan from the EBRD, a public debate had to be organised. It revealed that the project had no approval of the local population, and confirmed theories about the true wealth of biodiversity which was denied during the earlier stage of the process. EBRD approved a loan, but only conditionally, and the investor subsequently gave up on it. Croatia then became a full EU member and the investor was obliged to make a study regarding the impact on the nature by the European environmental network Natura 2000.

A number of public debates, round table discussions and several protest actions that brought together a large number of citizens were held between 2010 and 2015. Numerous media reports were made, not only at the local but also at the national level. Moreover, organizers uploaded integral video recordings of panel discussion and debates to the Internet. A documentary on Ombla was made. Ombla turned from a little-known phenomenon to a topic of national interest. This is corroborated by the fact that even children's radio shows were dedicated to it and that the source of Ombla was used as a scene for artistic performances. The project reaffirmed the name Ombla and gave the entire area a national importance, and ecological network Natura 2000 was named Ombla – Paleoombla (Paleoombla is one of Absolon's work titles for Vjetrenica and marks the karst area between Ombla and Vjetrenica).

In spring 2015 the State Institute for Nature Protection issued a negative opinion on the project (Hina, 2015), and in June 2015, the Municipal Council of Dubrovnik passed a resolution against the construction of Ombla HPP (Dubrovniknet, 2015). Dubrovnik-Neretva County then joined the resolution (Edubrovnik, 2015), and on 25 July, the media reported that the Ministry of Environment Protection and Nature refused to issue a positive opinion on the project (Nezirović, 2015), and thus probably put an end to the project of an underground hydroelectric power plant in Ombla.

CONCLUSION

In this study the examples of prominent phenomena of Dinaric karst, Vjetrenica and Ombla, showcase the development of karstology. It can be traced from its formation as a separate scientific discipline in the late 19th century, through its epistemological coming of age during the extensive expeditions of the 20th century, to the widening of the definition of respon-

sibilities of science influenced by a variety of holistic and multi-perspective paradigms of the recent period.

The first conclusion we can make is the poor visibility of karstology, namely, the fact that karstology rarely managed to impose itself as an independent discipline. Probing of the national bibliographic databases of countries in the Dinaric karst area illustrates this. With the exception of Slovenia, karstology is barely mentioned or not mentioned at all.

The second level of the problem concerns the scope and effectiveness of the research. Even the most thorough research of karst, as one within the project of hydropower plant on Trebišnjica, was strictly limited to water permeability of karst. They paid no attention to other karst aspects, for example, the subterranean fauna. The consequence of this is huge environmental damage in areas of operation, which has not been investigated to this day.

Karst is still perceived negatively, as a backward area, and subjected to the elements of the narrative heritage. It is applicable to both – Vjetrenica and Ombla – despite the fact that they have been explored to a significant degree. The image of Vjetrenica when it comes to tourists is still mythologized to some extent. As for Ombla, it is an important point in the cultural landscape of Rijeka Dubrovačka area, and the public does not connect it to the karst underground.

The latest plans for the use of these two karst phenomena, Vjetrenica as a cave for tourist visits and Ombla as a hazardous hydropower facility, under the influence of increasingly stronger environmental and holistic paradigms, encountered strong public opposition. Management plans were proposed and promoted by people from administrative and scientific establishment, and opposed by environmental activists and a small number of researchers, who were then joined by intellectuals, artists and local population.

This situation initiated the knowledge transfer from scientific sources to the general public. This happened through public debates, round table discussions, activist actions and media appearances. These two examples of knowledge transfer yielded two different outcomes, which significantly depended on the democratic, demographic and intellectual potential of the social environment itself.

Vjetrenica, much better known cave than Ombla, and was partly used as a backbone to defend it, received global support from the professionals and enjoyed great popularity. However, in a society preoccupied with post-war problems, with a dysfunctional administrative apparatus,

without the administrative tradition at the local level and with undeveloped civil sector, it lacked the means for application of knowledge transfer to the society.

Knowledge transfer about Ombla rested with a diverse group of interested stakeholders, from well-organized NGOs that planned campaigns against Ombla HPP, to the local population which lived from cultivation of their gardens and was in fear for the safety of their homes. A fortunate circumstance was the fact that Croatia, due to its full membership in the EU, improved its legislation. Once the public strongly and permanently opposed the construction of Ombla HPP, most political parties and politicians had no choice but to turn against the project as well. An important result of both examples of knowledge transfer is that it transformed the previously negative image of karst into a concept of extraordinary value which people identify with.

These two examples thus point to quite significant deficiencies of karstology. However, they also show the positive perspective: not only can the existing pejorative image of karst be replaced by the scientific truth about karst and so significantly change the value of the resources of society, but also that this truth can be realized in the system of nature and environment management.

And finally, if we continue with this analysis according to the contributions of Jovan Cvijić, it can be said that his key role in the development of karstology reflects to the research of karst in the wider area of Popovo polje, and that the studies he started, marked the scientific image of this karst for a long time. However, interpretations of Cvijić's works often remain largely closed in his time¹. Although, if he lived today, he himself, with an approach of a geographer who had a bigger picture of the whole area, both natural and social, would certainly be a promoter of concepts ahead of his time.

ACKNOWLEDGEMENTS: Translated by Anđela Štefanović.

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CURRENT AND HAZARDOUS MORPHOLOGICAL PROCESSES IN THE RIVER DELTAS OF THE CASPIAN SEA

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ABSTRACT: The paper contains the most important and unique information on the factors and regularities of the dynamics of marine edge and hydrographic network of the Volga, Ural, Terek, Sulak, Kura and Sefidrud river deltas. Large-scale fluctuations in the Caspian Sea level, river runoff, wind-wave conditions and morphological structure of nearshore zone in the river mouths, local water management activities are included in the list of the main factors. Current estimates of their magnitude and long-term variations are given. The differences are shown, the regularities and the factors of the dynamics of the delta coastline in periods of large-scale fall (until 1977) and increasing (in 1978–1995) Caspian Sea level are established. Quantitative evaluations and cartographic schemes of this process are obtained. A separate paper section is composed of results of a detailed analysis of dynamics of the hydrographic network and channel processes in the Caspian deltas. Regularities of this type of morphological processes are examined on the example of the Volga and Terek deltas. Morphological processes in the deltas were studied from the standpoint of their negative impact on the local environmental conditions and economic activity.

Key words: river, sea, delta, morphological processes

INTRODUCTION

The deltas of the Volga, Ural, Terek, Sulak, Samur, Kura and Sefidrud rivers are important and unique parts of the Caspian Sea coast. A distinctive features of the Caspian River deltas are continuous, large-scale and relatively rapid changes in their size, relief, soil and vegetation land-cover, shape and position of the sea shores, water objects and regime. These chang-

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es threaten the population and the unique delta ecosystems, form the economic damage, and limit the use of natural resources. At first glance, these changes do not contain any regularity, but then it certainly exists. To identify and explain the regularities and to determine their controlling factors is a very important and actual task. Its solution helps to get a tool to predict the reaction of river deltas on the sea-level rise, climate and anthropogenic changes in the value and regime of river water and sediment runoff, and other impacts.

SOURCE MATERIALS AND METHODS

In the analysis of the variations in the structure and regime of Caspian river deltas, the authors used various research methods and a time series of data. The studies of water and sediment runoff variations over time and water level variations in the Caspian Sea were based on long-term observational data on water discharges Q , suspended sediment discharges R , and water level H at gauging stations, as well as data on water use and hydraulic structures in the river basins and deltas. Besides, measurement data of river-beds (depth h , width B , slope of channel I) at gauging stations were used in the studies of channel processes in the Caspian deltas. Part of data were collected during expeditions (in some cases, with the participation of the authors) or taken from the literary and archive sources. All data series were verified and gaps in them were filled. Various empirical relationships between hydrological and morphometric characteristics were obtained.

Vast cartographic materials for the river deltas are systematized and converted to the same scale. Aerial photographs are transformed to Gauss-Krüger projection. Space photographs are also digitized and interpreted using an ad hoc procedure for the analysis of delta dynamics on space photographs (Kravtsova, 2001; *River mouths of the Caspian region...*, 2013). The cartographic materials transformed to the same scale are used as a basis for compiling a series of maps of the Ural, Terek, Sulak and Kura deltas for different times. The morphometric characteristics of the river deltas are determined by using up-to-date computer technologies.

Analysis of the processes taking place at river mouths and their approximate calculation are carried out with the use of the theory of mouth hydrological-morphological processes, methods of river hydraulics, equations of sediment balance at river mouths, and the hydrological-morphometric relationships (Mikhailov, 1998, 2010; Mikhailov et al., 1977, 1986; *River mouths of the Caspian region...*, 2013).

FACTORS IMPACTING ON THE CASPIAN RIVER DELTAS

Main factors impacting on hydrological regime and morphological structure of the Caspian river deltas are the following: long-term variations in sea level; total value, seasonal regime, long-term anthropogenic and climatic variations of river water runoff and sediment load; wave action; relief of coastal part of deltas and nearshore zone; local engineering measures. Analysis of instrumental observations of sea level has shown that during the XX and the beginning of the XXI centuries the Caspian Sea level was subjected to significant climate dependent changes (Table 1). They include a considerable fall by 1.96 m in 1930–1941, a slow decrease by 1.17 m in 1942–1977 a rapid and considerable rise in 1977–1995 (by 2.3 m), and a relative stabilization after 1995 with a slight trend toward a decrease. The major factors governing the Caspian water balance and, consequently, the sea level are the climate conditions in the Volga basin and the water runoff of this river. Its variations caused the large-scale variations in the sea level (Mikhailov et al., 2012). The obtained relationship between the Caspian Sea level and Volga water runoff shows, that this dependence is not direct. It is most close in the period when sea level is dropping and somewhat less distinct for the period when sea level is rising and for the series combining both these periods.

Table 1. *Changes in water level of the Caspian Sea at the Makhachkala gauging station*

Period (number of years)	Water level H_{sea} , m Baltic System		Water level change	
	<i>in the beginning of the period</i>	<i>in the end of the period</i>	<i>m</i>	<i>cm/year</i>
1883–1929 (30)	–25.12	–25.88	–0.76	–1.6
1930–1941 (12)	–25.88	–27.84	–1.96	–16.3
1942–1977 (36)	–27.84	–29.01	–1.17	–3.2
1978–1995 (18)	–29.01	–26.66	+2,35	+13,1
1996–2012 (17)	–26.66	–27.57	–0.91	–5.4

Source of data: authors

The changes in river water runoff and sediment load had both natural and anthropogenic reasons. The features of long-term variations in Caspian river runoff allows us to identify several characteristic periods for all period of instrumental observations (Table 2), whose boundaries are mostly determined by large-scale hydroengineering construction and the dynamics of water use in river basins. In addition, specific periods in variations in sea level have been taken into account. In 1956–1960, the Volga River

was regulated by the Volga-Kama cascade of the large reservoirs (a total volume 193.9 km³). As a result, suspended sediment load decreased by 1.9 times. Volga water runoff demonstrates, on the contrary, a larger role of climate-induced variations and a smaller effect of economic activity in its basin. However, intra-annual water regime of the Volga and its delta the Volga-Kama reservoirs have changed significantly (Mikhailov et al., 2004a; *River mouths of the Caspian region...*, 2013). River runoff of the Sulak, Kura and Sefidrud was regulated by the large reservoirs in 1975, 1953 and 1962, respectively. The current total volume of reservoirs in its basins is 3.6, 19.8 and 1.8 km³, respectively. As a result of this regulation, suspended sediment load of the Kura and Sulak rivers decreased by 2.4 and 8.3 times. Besides, water runoff and, to a lesser extent, sediment load of the Terek, Sulak, Kura and Sefidrud has been reduced by the large-scale water withdrawal in river basins. Samur River delta has lost a considerable amount of river water and sediment due to water withdrawal. Anthropogenic changes in water regime and sediment load of the Ural River were less significant.

Table 2. Volume of water runoff (W_Q), suspended sediment load (W_R) and suspended sediment concentration y (s) of rivers flowing into the Caspian Sea

River (gauging station)	Water runoff		Runoff of suspended sediment		
	Period	W_Q , km ³ / year	Period	W_R , million t/ year	s, g/m ³
Volga (Verkhnee Lebyazh'e)	1881–1955	(245)	1881–1955	(12.9)	(55)
	1956–1960	239	1956–1960	12.7	54
	1961–2010	248	1961–2006	6.7	27
	1978–1995	268	1978–1995	8.5	32
	1996–2010	249			
Ural (Topoli, Makhambet since 1973)	1921–1957	9.29	1936–1957	(3.0)	(328)
	1958–2006	8.26	1958–1970	2.7	333
	1978–1995	9.02	1982–1988		
	1996–2006	8.19			
Terek (Stepnoe)	1924–1956	10.1	1925–1956	20.8	2060
	1957–2007	9.03	1957–1995	(16.3)	(1870)
	1978–1995	8.71	1978–1995	(15.3)	(1760)
	1996–2008	10.1			
Sulak (Sulak)	1925–1974	(4.75)	1925–1974	(14.7)	(3090)
	1975–2008	4.69	1975–2007	(1.8)	(376)
	1978–1995	4.52	1978–1995	(1.7)	(367)
	1996–2008	5.17			

Samur (Usukh-Chai)	1930–2008	2.1	1963–2008	7.7	3900
	1927–1952	(17.8)	1948–1952	34.7	1930
Kura (Sal'yany)	1953–2003	(14.1)	1953–2003	(14.4)	(1020)
	1978–1995	(13.8)	1978–1995	(11.6)	(840)
	1996–2003	(10.0)			
Sefidrud (Rudbar)	1969–2005	4.16	1951–1995	26.0	6440

Source of data: authors

Winds of eastern direction dominate during a year in the shallow nearshore zone of the Volga and Old Terek delta (*Hydrometeorology and hydrochemistry of USSR Seas*, 1992). The wind waves are relatively weak here. In all seasons, winds of western and eastern directions dominate at the Ural mouth. Near the new mouths of the Terek and the Sulak, southeastern and northwestern winds dominate, creating moderate waves with the same direction (*Hydrology of the Terek and Sulak mouths*, 1993). The most hazardous are assumed to be waves with the southeastern direction. This determines the direction of alongshore drift of delta erosion products (from the south to the north along the shore). Strong northern and northeastern winds are often recorded near the Kura mouth. These winds cause waves with a northern component. The height of waves with 5% occurrence in the coastal zone reaches 3–4 m. These high waves cause a strong southward alongshore sediment drift (*Hydrology of the Kura Mouth Area*, 1971). Coastal parts of all Caspian deltas are flat and low. The nearshore zone of the Volga mouth is extremely wide and shallow. The nearshore zones of the Terek, Sulak and Kura are narrow and deep, while the Ural mouth nearshore is relatively shallow.

Among the main local engineering measures in river mouth areas, one can notice the following: the Volga-Caspian Sea and Ural-Caspian Sea navigation canals passing through the deltas and nearshore zones; navigation canal in the Kura delta; artificial straightening of branch channels in the Sulak (1958) and Terek (1977) deltas; artificial deepening river-beds in many river deltas; artificial water-distributers in the deltas of the Volga (1966–1973), Terek (1956, 1959), Samur (1957) and Sefidrud; protective dams; dense network of melioration canals in the Terek and Sefidrud deltas; fish ladder canals in the Ural and Volga deltas, and others.

REGULARITIES IN DYNAMICS OF THE RIVER DELTA COASTLINE

The Caspian delta coastlines (DCL), first of all, respond to large-scale sea-level changes. During dropping of the sea level, DCL shifts towards the

sea and the delta area increases. Areas of the Ural, Sulak and Kura deltas increased from 103 to 522 km² in 1862–1977, from 6.2 to 70.6 km² in 1862–1978, and from 29 to 189 km² in 1852–1976, respectively (Table 3; Figure 1, 2). In the period from 1950 to 1980 coastline of the Sefidrud “new delta” protruded into the sea at 800 m in the western sector, and 1600 m in the eastern (Gholamreza, 2003; Lahijani et al., 2008). Different response of river deltas to the sea level fall is primarily due to differences in morphological and hydrological features of the nearshore zone (NSZ) in the river mouths, in the length of DCL as well as due to the sediment load value of these rivers. The reasons of large values are that protruding the delta consists of deposition of river sediment within NSZ (the “active” component of dynamics; it is especially significant in the river mouths with a large sediment load) and draining of the coasts due to sea level fall (“passive” component). For example, in 1958–1978 the “passive” protrusion of the Sulak delta (at a sea level fall by 1.74 m and bottom slope in NSZ equal to about 2 ‰) should amount to 870 m. However, the actual protrusion was 2300 m. Thus, the “active” protrusion of the delta into the sea accounts for 1430 m. The empirical relationships between the parameters of the deltas and the sea level can be very close (Figure 3).

In the period of sea level rise the protrusion rates of these deltas into the sea are reduced, or coast become stable, or it even may start to retreat (Table 3; Figure 1, 2). An important reason is anthropogenic decrease of sediment load (Table 2). The Sulak River delta area decreased from 70.6 to 45.1 km² in 1978–1997; over the period of 1976–1993 the Kura River delta decreased from 189 to 111 km². In these cases, delta flooding was accompanied by wave-induced erosion of the delta shores and forming coastal bars and small lagoons. During 1977–1995, the maritime belt (up to 15–20 km wide) of the Ural River delta was submerged and the delta area decreased from about 522 to 350 km². In spite of the Caspian Sea level rise, protrusion of the Terek “new delta” into the sea, over the period of 1977–1997, reached 1.6 km (ΔL) and 6.1 km² (ΔF). In 1978–1995 DCL of the Sefidrud retreated very slightly (only 30–100 m) and about 1.2 km² of beaches were submerged (Kazancı et al., 2004; Lahijani et al., 2008). Landscape structure of the Caspian deltas, especially in the coastal part, according to results of the author’s investigations (Kravtsova & Ilyukhina, 2002; Mikhailov et al., 2003; Mikhailov et al., 2004b; *River mouths of the Caspian region...*, 2013), have changed greatly.

What is the reason for the differences in the dynamics of coastline of deltas, having deep nearshore zone, in the period of sea level rise? In order to explain these differences, the comparison of volume of river delta-form-

ing (coarse) sediment with, so-called, backwater prism volume ΔW_{bwp} is needed. It is calculated using the approximate equation: $\Delta W_{\text{bwp}} = 0.5 F_{\text{subm}} \Delta H_s$, where F_{subm} is an area of potential submergence; $0.5 \Delta H_s$ is a mean value of the sea level rise in the zone of potential submergence. The value F_{subm} is calculated from the equation: $F_{\text{subm}} = L_{\text{subm}} L_{\text{DCL}} \approx \Delta H_s L_{\text{DCL}} / i_d$, where L_{subm} is the mean width of the potential zone of submergence, L_{DCL} is the length of the delta coastline, i_d is the slope of the delta surface.

Table 3. *Morphometric characteristics of deltas of the Ural, Terek, Sulak and Kura rivers: their length along main channel (L) and area (F)*

River	Year	H_{sea} , m in BS	L, km	F, km ²
Ural	1834	(-25.3)	10.0	80.0
	1862	(-25.92)	13.1	103
	1927	-26.23	19.1	235
	1945	-27.93	22.3	373
	1977	-29.01	32.0	522
	1996	-26.80	32.0	(350)
Terek ("new delta")	1977	-29.01	0.64	1.35
	1980	-28.57	1.23	2.52
	1991	-27.26	1.90	4.80
	1997	-26.95	2.20	7.40
	2011	-27.40	3.60	13.5
Sulak	1862	(-25.92)	2.22	6.20
	1928	-26.07	9.10	30.5
	1941	-27.84	11.3	51.0
	1958	-28.21	5.57	62.1
	1978	-28.95	7.90	70.6
	1997	-26.95	6.32	45.1
	2009	-27.21	6.00	44.2
Kura	1852	-25.92	7.70	29.0
	1907	-25.70	14.7	84.0
	1929	-25.88	17.5	94.0
	1946	-27.87	21.7	161
	1976	-28.97	22.7	189
	1993	-26.96	14.0	111
	2008	-27.14	17.5	142

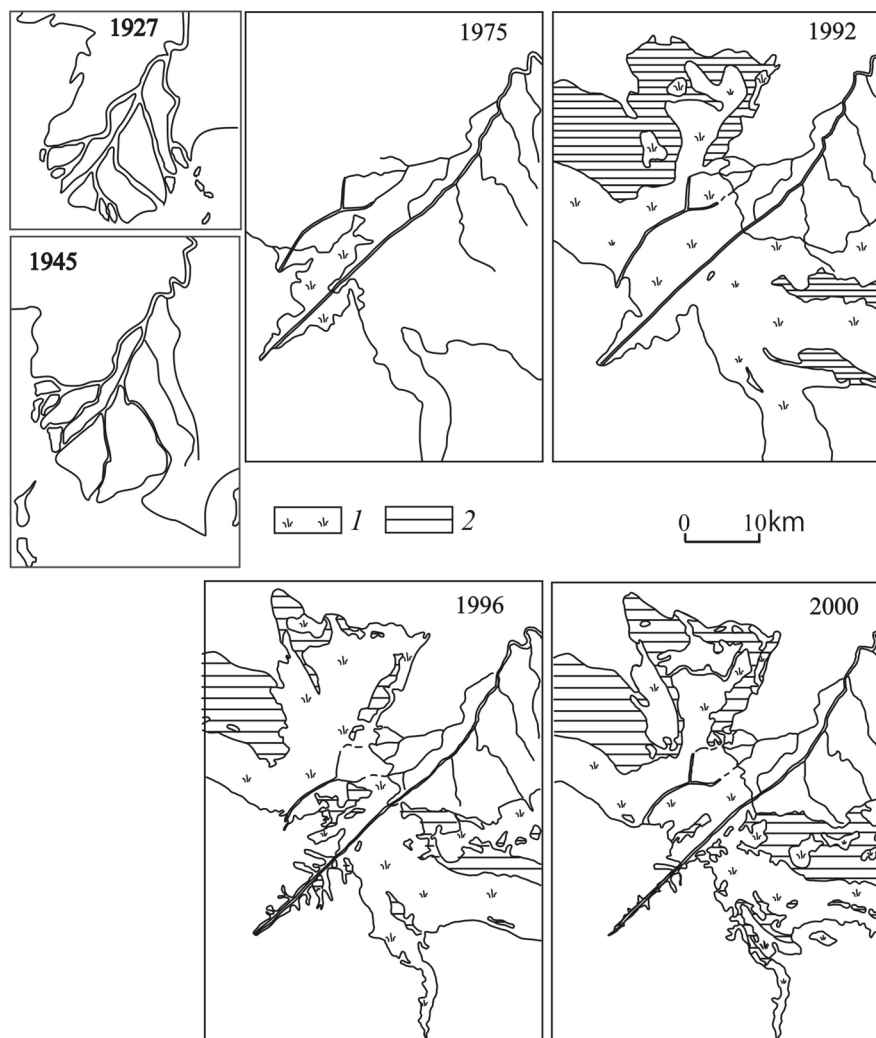


Fig. 1. Changes in the Ural delta from 1927 to 2000 (Krasnozhon & Mazavina, 1988; Mikhailov et al., 2004a; Polonsky et al., 1992). 1 – Reed cover, 2 – open water after sea level rise, separated from the sea by reed belts

The results of calculation using these formulas are generally in reasonable agreement with the observation results at the mouths of the Caspian Sea rivers that have deep and relatively shallow nearshore zones. Three cases are possible. First, the river sediment load is insignificant, the backwater prism is not filled with river sediments, passive submergence of the delta surface is observed and the area of actual delta submergence coincides with the area of potential submergence. Second, river sediments only par-

tially fill the backwater prism, and part of the coastal zone of deltas gets submerged by sea water. Third, the river sediment load is significant, the backwater prism is filled with river sediments and, in spite of the sea level rise, the delta goes on protruding into the sea. The first case was typical of the Sulak and Kura river deltas, which sediment load has been considerably decreased (Table 2). Sediment load of the Sulak River over the period of 1978–1997 totaled 30 mln m³. This volume turned out to be noticeably smaller than the volume of the backwater prism (70.6 mln m³) at the values $\Delta H_s = +2.00$ m; this fact predetermined the aforementioned considerable submergence of the Sulak River delta. Different situation, typical of the third case, was observed at the mouth of the main branch of the Terek River delta. The delta-forming sediment load was rather considerable (17 mln m³), and it exceeded the volume of the backwater prism, which corresponded to the area of the small “new” Terek delta approximating 3.5 km² and to the sea level rise by 2.35 m over the period of 1978–1995 (about 6.5 mln m³, including backwater prism within the river-bed). Therefore, the “new delta” of the Terek River continues protruding into the sea in spite of its significant level rise. Situation, typical of the second case, was observed in the site of location of the “new delta” of the Sefidrud River.

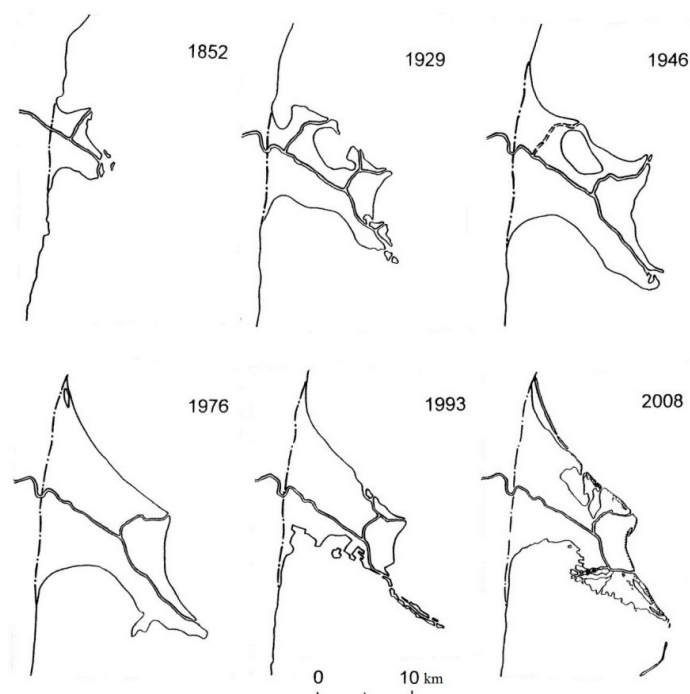


Fig. 2. Schemes of the changes in the Kura delta from 1852 to 2008

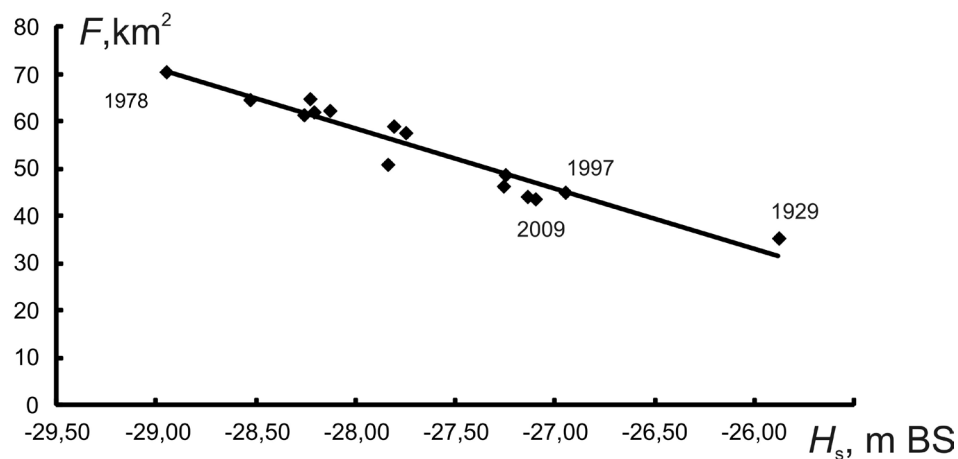


Fig. 3. Graph of empirical relationship between area of the Sulak River delta and the sea level at the Makhachkala gauging station

DCL of the Volga River Delta has also undergone significant changes during the fall of sea level. Moreover, the passive component of delta expansion dominated due to moderate sediment load of the Volga, intensive accumulation of sediments within the Delta and very shallow NSZ. In various stages of the sea level drop the character of this passive protrusion was different and could virtually stop in spite of the continued decline in sea level. During the sea level rise and in subsequent years the position of the Volga Delta coastline has changed slightly. Why so? The Volga River mouth has an extremely wide and shallow NSZ; the bottom of the shallow NSZ represents the submerged surface of the ancient delta. At the low level of the Caspian Sea (below the elevation of -26.5 ... -27.0 m in BS, as it was in 1940–1990, for example), the direct connection between the delta branches and the sea is broken and the water level near the delta coastline appears to be higher than the sea level (Isupova, 2008; Mikhailov et al., 2012). By the beginning of the Caspian Sea level rise in 1978, this difference exceeded 2 m. At that time, the shallow part of the Volga NSZ functioned as a large broad-crested weir. This, in particular, explains the slowdown in protrusion of the Volga delta in the sea since the 1940s up to 1977. The Caspian Sea level rise over the period of 1978-1995 resulted in gradual submergence of the shallow part of NSZ. The water level at the gauging station on the Iskusstvennyi island (27 km offshore from the DCL) started to rise in 1982 and, by 1995, it increased by 0.9 m; during 1986-1995, the water level at the DCL proper increased only by 0.4 m and, by the end of this period, it was nearly equal to the sea level. The value of water level rise did not exceed 0.2 m in the lower reaches of branches in the eastern part of the delta. The response of

the Volga River delta to the level fluctuations in the Caspian Sea is unique. It seems likely that, at present, there are no river mouths with such a vast and shallow NSZ on the Earth. Biological factor (overgrown by reed belts of the marine shallow areas and the bays (local name – *kultuk*) in NSZ) plays an important role in the dynamics of DCL.

Quantitative estimations of protrusion of the Volga Delta into the sea vary greatly in different literary sources. This can be explained by low quality of cartographic materials and its georeferencing; different methods of analysis of the maps. Sometimes it was impossible to separate extensive reed cover at the seaside area from the coastal land. Nevertheless, since the early nineteenth century to the 1920s, the average rate of protrusion of the Delta into the sea was 94–363 m/year (Valedinskii & Apollov, 1928; Baidin, 1959; *Lower Volga...*, 2002). According to I.A. Labutina (*Lower Volga...*, 2002; *River mouths of the Caspian region...*, 2013), in 1868–1927 the Delta area increased by 1437 km², the rate of protrusion of the Western part was 0.2 km/year, and the Eastern -0.5 km/year. In 1927–1937, when sea level dropped by ~0.7 m (ΔH_s), the greatest rate of delta protrusion was recorded (Rogov, 1986). The increase in the total area of the delta (ΔF) was 1800 km², the linear growth (ΔL) was 9.5 km. In 1937–1960 ($\Delta H_s = -1.31$ m) the increase in delta area was appreciably less ($\Delta F = 555$ km², $\Delta L = 2.9$ km). According to I.A. Labutina *River mouths of the Caspian region...*, 2013), $\Delta F = 1500$ km² (in 1927–1960). In 1960–1982, when sea level first dropped by 0.78 m and next rose by the same value, the delta area practically did not change ($\Delta F = 50$ km², $\Delta L = 2.6$ km) (Rogov, 1986), wherea, according to I.A. Labutina, in 1960–1976 $\Delta F = 906$ km² ($\Delta H_s = -0.7$ m). As specially mentioned in (Rogov, 1986; *Volga Mouth Area...*, 1998), after 1960, notwithstanding the level drop, which continued until 1978, the position of Volga DCL practically did not change. According to I.A. Labutina, in 1977–1995 the major changes the position of DCL were caused by change in the reed cover area (ΔF_R): in 1976–1987 – $\Delta F_R = 980$ km², in 1987–1998 – $\Delta F_R = 250$ km².

Since 1996, the intensive increase in the area of the Kura delta and the “new” Terek delta is observed (Table 2, Figure 2). In the Volga, Urals and Sefidrud deltas this process has a moderate rate. Seacoast of Sulak delta is stable, and in some sites is eroded.

The rapid shift of DCL in either direction causes a different kind of environmental, economic and social damages. A significant dropping in the level of the Caspian Sea to 1977 and the rapid protrusion of the deltas into the sea caused a decline in groundwater level and increasing the aridity of a considerable part of the coast. Navigation and fish ladder canals became shallower, water areas and objects for graziery of whitebait decreased, the

salinity of marine waters of the Northern Caspian increased, as a result, the fish catch in the sea decreased. The sea ports, the municipal services of coastal settlements have suffered damage. Positive effects occurred, as well. A more significant value of negative after-effects is associated with rising level of the Caspian Sea. Areas of pastures and farmland decreased. Flooding and water logging roads, pipelines, industrial works, fish processing companies, oil and gas fields, public utilities, landfills, cemeteries and others happened. Only on the Russian coast of more than 320 thousand hectares of valuable land were flooded (Khublaryan, 2000). Water pollution by oil products, pesticides, and household waste has occurred. Groundwater levels rose; flooding and salinization the soils, abrasion and collapse of the seashores has increased. Economic damage to Russia was equal to 0.5 to 1.0 billion US dollars (Bolgov et al., 2007; Frolov, 2003; Khublaryan, 2000). The total cumulative direct losses to all Caspian States, according to the WMO, were about 15 billion US dollars. Among the positive effects it is improvement of conditions for fish spawning and feeding.

CHANNEL PROCESSES IN THE CASPIAN RIVER DELTAS AND CHANGES OF THE HYDROGRAPHIC NETWORK

The main elements of the hydrographic network of river deltas are the rivers and the delta watercourses, lakes, wetlands and artificial water objects. Their shape and morphometric characteristics are continuously changing under the influence of external and local environmental factors. This process has the highest rate in the river deltas that have a large sediment load, as well as in the coastal part of the delta during the sea level rise. The delta branches are especially volatile among the elements of the hydrographic network. Features and regularities of these changes we propose to consider in detail on the example of the Volga and Terek deltas.

The Volga Delta is one of the largest in the world. It covers an area of 13900 km² (*River mouths of the Caspian region...*, 2013). It includes the actually Delta (8800 km²), as well as Western (4200 km²) and Eastern (900 km²) territories that are occupied by a large number of small lakes, called *ilmen*. The area of these territories (over 2500 km²) and number of lakes has increased after 1977 due to an increase in water runoff of the Volga river (Table 2) and the penetration in these lakes of marine waters during sea level rise. These are positive changes, because the native population uses the *ilmen* for fish farming, agricultural activity's water supply and as a source of drinking water. In the main (central) part of the Volga Delta

the key element of the hydrographic network is a set of large and small watercourses. In the mid-1970s, the total number of transit watercourses was 757, and their total length was equal to 4500 km (Mikhailov et al., 1977). Density of the river-channel network increases from the upper part of the Delta to the sea – from 5 to 20 km/km² in the western district of the main part of the Delta (Baidin, 1962). The main delta branches are the Buzan, Akhtuba, Old Volga, Bolda, Kizan, Bakhtemir.

The process of the reformation of watercourses and their morphometric characteristics are slow (due to small sediment runoff of the Volga) and are not always harmonized with large-scale sea level fluctuations. Unlike other Caspian river mouths, sea level fall did not cause considerable erosion in the branch channels. It phenomena may be explained that the basis of erosion for the delta branches was not mean sea level, but the surface of the bed in nearshore zone and the level near delta coastline, which never fell below –26.9 m BS (this feature has been discussed in the previous Chapter). Another cause is resistance to erosion by Khvalynian clays, underlying the bottom of the delta branches. Along main and active branches the sites of erosion and sediment accumulation is alternated without a clear regularities. Studies showed (Mikhailov et al., 1977; Polonsky et al., 1992; *Volga Mouth Area...*, 1998; *River mouths of the Caspian region...*, 2013 etc.), that intensification of main branches and the dying of smaller ones take place all over the extremely braided channel network in the Volga delta. The number of silting or dying watercourses in the Volga delta is much greater than that of that of eroded and becoming more active. The total number of watercourses in the coastal parts of the Volga Delta depends on variations in water level at delta coastline. During the rapid delta protrusion into the sea in the first half of the XX century, the number of watercourses reaching the sea decreased from 330 to 230 because of their merging (Baidin, 1962). The number of branch mouths has increased from 200 at the end of the XIX century to 850 in 1950s (Belevich, 1958), when water level at delta coastline stabilized, and to 1000 in the 1980s (Rogov, 1986). In the period of sea level rise in 1978-1995 and during its subsequent relative stabilization significant sedimentation in the branches of the Volga delta was not detected. Hydrographic changes in the Volga delta do not represent significant danger. Negative redistribution of water flow between delta branch systems are regulated by the artificial water distributor at the delta head and the special dam, that separates the eastern (fisheries management) district of the Delta from the western district. The problems of silting delta watercourses are solved by their artificial deepening, and abrasion of river banks is by their strengthening.

In the Terek River delta the main changes of the hydrographic network are associated with following: 1) an increase in number and total length of the artificial canals (mainly to the North and South of the Kargalinskii Proryv), construction of the various hydrotechnical structures (artificial water-distributors, protective dams, pumping stations) (Figure 4), 2) active channel processes along the main delta branch Kargalinskii Proryv, 3) a decrease in area of the delta lakes, especially in the lower section of the Kargalinskii Proryv. Kargalinskii Proryv was formed in 1914, during the disastrous floods, accompanied by the destruction of the right banks of the Terek River and the formation of new (eastern) and shorter path for river runoff into the sea. Since the beginning of sustainable functioning, this branch old deltaic channel network in the northern part began rapidly to die off. Generally, such a scheme of evolution of channel network is typical for this delta, and formation of new main branches occurred in the Delta (in natural conditions and after catastrophic floods) about 1 every 50-70 years (Belyaev, 1963; Baidin et al, 1971). This feature distinguishes the Terek river delta from the Volga and Ural deltas, and unifies it with the Sulak, Samur, Kura and Sefidrud deltas. In the Kura delta last such event was in 1993, in the Sulak delta in 1920 (Mikhailov et al., 2003, 2004b). The factors of this process: 1) a very large sediment load of the Terek, Sulak, Samur, Kura and Sefidrud (Table 2) and deposition of main part of these sediments in the deltaic branches that intensifies river-channel processes; 2) sometimes catastrophic summer-autumn floods; 3) fast and appropriate response of river-channel processes and water levels in the branches on Caspian sea level rising, in particular in the lower part of the branches in the large delta of the Terek River, and the branches in the Sulak and Kura deltas throughout their length. Another feature of the Terek delta is a small number of the branches.

Until 1977s Kargalinskii Proryv flowed into the Agrakhan Bay connected to the Caspian Sea through the shallow Kizlyar Gulf. Here, since the late 1930s the branch began to form so-called Alikazgan (internal) delta with its channel net. The area of this delta was 0 km² (in 1939), 46 km² (1953), 78 km² (in 1967) and 130 km² (1977). In 1962, the branch has reached the Agrakhan peninsula separating the Agrakhan Bay from the sea and turned north toward the Kizlyar Gulf. As a result, the Agrakhan Bay was divided into southern and northern parts. Southern Agrakhan lost contact with the sea, and, over time, the salinity of its waters has reduced, as well as area. In 1901-1903 Agrakhan Bay area was equaled 300 km² ($H_s = -25.6$ m BS) (Baidin et al, 1971), in 1978 the area of only Southern Agrakhan was 60 km² (*River mouths of the Caspian region...*, 2013), in 2009-2012 it was 62 km² (*Southern Agrakhan Lake...*, 2014). At the same time,

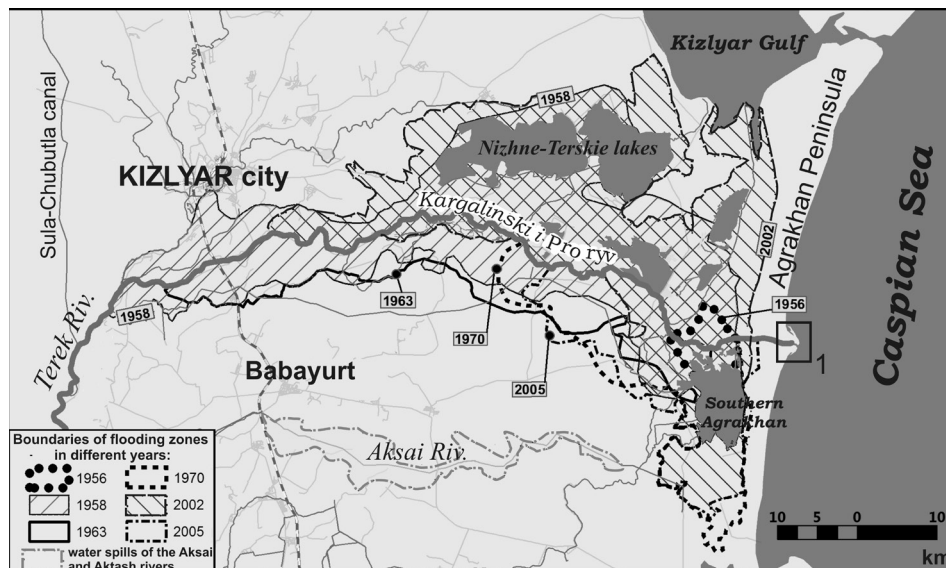


Fig. 4. The scheme of the Central and Southern parts of the Terek Delta with the boundaries of the zones of flooding by river waters during the catastrophic inundations (Magritsky et al., 2013; Gorelits et al., 2004; RIVER MOUTHS OF THE CASPIAN REGION..., 2013). 1 – position of the “new delta”.

siltation and overgrowing other delta lakes was observed in conditions of climate and anthropogenic reduction of water flow of the Terek. Lengthening Kargalinskii Proryv (over 30 km) and, as a consequence, reduction of water surface slope was an additional factor in the intensification of the sediment accumulation in the river-bed and rising the bottom elevations up to 1977, despite the fall of the sea level in this period (Figure 5). Moreover, the water levels in the branch, which is fenced about protective dams, and even bottom elevations could exceed floodplain elevation (at the some reaches and during floods). As a result, the frequency and the scale of inundations in 1950–1970-ies increased (Figure 4). The threat of large-scale breakout of river waters in a new direction and the beginning of a new cycle in the development of the delta appeared. Only after opening in August 1977 an artificial canal, which cut through the Agrakhan peninsula and connected Kargalinskii Proryv directly with the Caspian Sea, this threat has diminished significantly. As a result, the length of the branch has decreased by 17.5 km, slope and flow velocity increased, active erosion of river-bed started (with a multi-year regressive erosion and a significant decrease in bottom elevations – 3 m in the “new mouth” of the Kargalinskii Proryv and more 1 m in 20 km from the sea) (Figure 5), the “new delta” on the deep seashore of the Eastern coast of the Agrakhan Peninsula began to form. In 1978–1995, and in subsequent years, the ef-

fect of this event significantly has been reduced due to large-scale sea level rise and deposition of sediments in the branch. These processes have led to higher elevations of the bottom and water level in the branch channel. As a result, in 2002 and 2005 catastrophic flooding occurred in the delta (Figure 4). In other deltas flood risks decreased as sediment load has decreased several times (Table 2). At the same time, wide water spills of the Terek River (from 50 to 1250 km²) during inundations supply water and desalinate degrading delta lakes, increase the productivity of pastures.

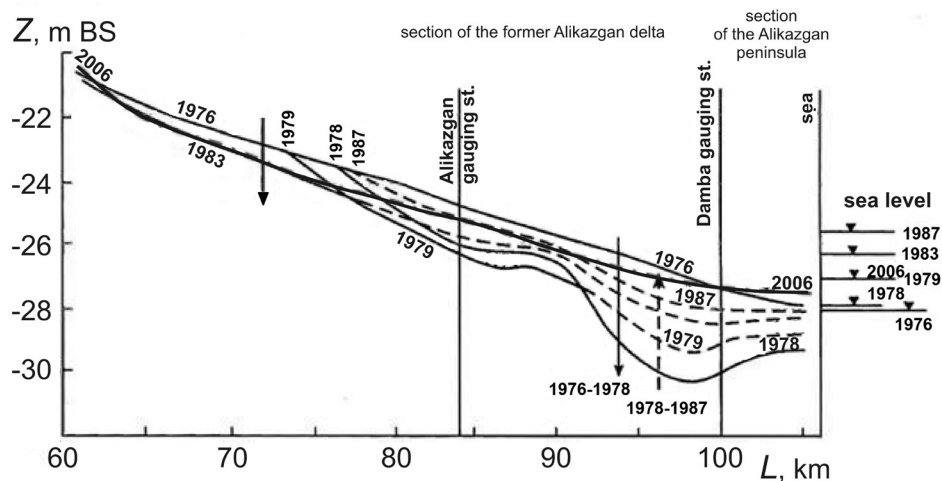


Fig. 5. Longitudinal profiles of the Kargalinskii Proryv channel in 1976–2006. Arrows indicate the direction of vertical deformation (Mikhailov & Mikhailova, 1998; Alexeevsky et al., 2007)

ACKNOWLEDGEMENTS: This work was supported by the Russian Foundation for Basic Research (grants No. 11-05-00199 and 14-05-00949). Continued studies of the deltas is being financed through a grant from the Russian science Foundation No. 14-17-00155.

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JOVAN CVIJIĆ'S RESEARCH AS AN INCENTIVE TO GEOHERITAGE CONSERVATION IN SERBIA

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ABSTRACT: Only a few researchers have been fortunate enough to have their work assessed as a turning point in the science of a country, and the period in which they researched named after them, which is in this case the Age of Jovan Cvijić. Physical-geographical and geological research conducted by Cvijić became the starting point for many disciplines, and some geosites and landscapes that he had described were, according to the contemporary criteria, exactly the geoheritage sites. Despite the fact that the research and protection of geoheritage as a new geo-discipline was determined in the early 90's of the 20th century, according to the analysis of geoheritage elements in Cvijić's papers, it was evident that all these geoheritage sites had been described, precisely: individual representative geosites, the so-called textbook examples and *curiosities*, but also exceptionally valuable zones and areas evidencing geological processes, both fossil and recent ones. The analysis was conducted based on the books *Geomorphology (Volume 1–2)*, *Karst Geography* and *The Karst*. Selected sites were compared with protected sites in Serbia, as well as with The Inventory of Serbian Geoheritage Sites.

Key words: geodiversity, geoheritage, Jovan Cvijić, Serbia

INTRODUCTION

In the second half of the 19th century, the published papers that described the nature of Serbia were relatively rare and of reconnaissance character (Boue, Baron Herder...). Researchers of geodiversity had to compare the phenomena or processes with examples from around the world. They used to point to an extraordinary example, a textbook example, a characteristic phenomenon, giving special importance to only a few elements of geodi-

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versity, thus showing that the evaluation of geo-elements was performed at the research area. In this period, valuation assumed the quantitative indicators or the expressive character / regularity of a form or phenomenon.

The circumstances in which Jovan Cvijić researched were not essentially different from the above mentioned circumstances. However, Cvijić was the modern educated researcher, who had a good cooperation with colleagues from abroad and the access to the scientific literature in major languages. Therefore, in his writings or monographs, a very extensive bibliography of foreign works was cited, which revealed that the valuation of phenomena and processes observed at the research area had been carried out in the best possible way.

MATERIALS

As a very inspired researcher, Jovan Cvijić tried to research and comprise the whole Balkan Peninsula and to provide a geomorphological survey. Although a pretty ambitious endeavor, Cvijić succeeded in that. In the abundance of material, and particularly the results that attracted attention and admiration of not only Cvijić's contemporaries, but also the researchers nowadays, this paper gives the analysis of the geological heritage elements based on the following works of Cvijić: "*Karst: a geographical monograph*"; "*The new results on the glacial epoch of the Balkan Peninsula*" (reprints: Cvijić, 1987a); "*Geography of Karst*", which includes the Serbian translation of "*La géographie des terrains calcaires*", and "*Caves and underground morphology in Eastern Serbia*" (reprints: Cvijić, 1987c); and "*Geomorphology*" – Volumes 1 and 2 (reprints: Cvijić, 1987b). The geosites recognized by Cvijić as specific in relation to those he had encountered in his research, are selected as well.

METHODS

The specific character of this paper imposed the criteria that had to be used in order to discover the elements of geological heritage in the works that had appeared long before the birth of the term geoheritage and even geodiversity. Therefore the used methods included:

- "linguistic" approach
- method of comparison

"Linguistic" approach assumed selecting all those individual representative geosites, especially valuable zones and areas evidencing geo-processes,

both fossil and recent, based on Cvijić`s records, that is, in the cases where the name was complemented by certain adjectives or words emphasizing that: *the most attractive, the best or an excellent example, the specific genesis, the most typical case, one of the three, especially interesting, particularly stands out in the relief, more elegant, striking, consisting of sole ..., plastic, the most important.*

The adjectives of irregular comparison in Serbian language were selected, referring to geosites pointed out by Cvijić according to a quantitative parameter and compared with other geosites in Serbia or abroad. In these cases Cvijić almost always recorded: *the most numerous, the largest, highest, longest, lowest, most developed, most branched.*

Thus, selected geosites, which are listed in the Table 1, were compared with the Inventory of Serbian Geoheritage Sites (2005, 2008) and a list of protected geoheritage sites in Serbia. All geosites pointed out by Cvijić are presented on Fig. 1.

Table 1. *Important geosites, zones and areas according to Cvijić, and their current status in terms of protection and geoheritage (GHI – Geoheritage Inventory of Serbia)*
[N.m. = Nature monument; M.n. = Monument of nature; SNR = Special Nature Reserve; NP = Nature Park]

No.	Geosite named by Cvijić	Geo-significance according to Cvijić	Protected area	GHI
1	Velika Pećina u Dubokoj (Dubočka cave)	The most numerous and largest, 12 giant potholes with a diameter of 1–6 m, depth of 1–3 m and length of 800 m (Cvijić, 1987c, p.11). Secondary canals have the characteristics of dry caves. It is the longest cave in Eastern Serbia (1960 m) (Cvijić, 1987c, p.14).	N.m. (1949)	+
2	Prekonoška cave	The front and rear part are active in hydrological terms, although the cave is dry (Cvijić, 1987c, p.13, 14).	M.n. (2005)	+
3	The source and the upper basin of Pek river	The most distributed are large river caves (Rajkova and Paskova, Pešter) (Cvijić, 1987c, p.14). The best examples of intersected valleys in Serbia (Cvijić, 1987c, p. 209). The best example of intersected river valley (Cvijić, 1987a, p. 278).		
4	Ravanička cave	The largest one with an intermittent stream (Cvijić, 1987c, p.14).	N.m. (1951)	+
5	Lazareva cave	The longest dry cave (about 800 m) with the most branched canals in our region (Cvijić, 1987c, p.36).	N.m. (1949) M.n. (2000), Lazarev kanjon	+

6	Sesalačka cave	It makes the transition between long and dark caves, hydrologically active ones and short caves (Cvijić, 1987c, p.25).		+
7	Natural bridge Mala Prerast on Vratna river (Prerast Mika)	More elegant than Velika Prerast (stone bridge) (Cvijić, 1987c, p.26).	N.m. (1957)	+
8	Natural bridge Velika Prerast on Vratna river (Prerast Mare)	Walls carved by many rock shelters (Cvijić, 1987c, p.26).	N.m. (1957)	+
9	Natural bridge Samar on Perast - Prerast	One of three stone bridges in Eastern Serbia (Cvijić, 1987c, p.26).	N.m. (1955)	+
10	Natural bridge Bogova Vrata	At the foot of Rtanj Mt., village Milušinac, Sokobanja district (Cvijić, 1987c, p.27).	SNR Rtanj (2013)	
11	Prozorac (hole in the rocks)	Above Carevo Koritoin Jelašnica "It won't last long due to a rockfall (Cvijić, 1987c, p. 27)".	SNR Jelašnica gorge (1995)	+
12	Popšička cave	The result of the running water erosion. Specific genesis, without a similar example in the literature (Cvijić, 1987c, p. 32).	M.n. (2005)	+
13	The cave in Perast (Samar Cave)	Two springs in the cave have the lowest temperature (5,5°S) of all cave springs in Eastern Serbia (Cvijić, 1987c, p.32).	N.m. (1955)	+
14	Cave Prema Piskavici	A dry accessible cave, 20–30 m long, in the northern part of Tupižnica, on the left bank of Bela Reka river (Cvijić, 1987c, p.36).		
15	Dedačko hill	A short accessible cave. On the right bank of Nišava river, in the part of Bela Palanka plain and in front of Sićevo gorge it is named Dedac (Cvijić, 1987c, p.36).		
16	On the cliff of the fortification Svrljig	A short completely accessible cave (Cvijić, 1987c, p.36).		
17	Vasiljska cave	In Crvena Stena, village Vasilj (Zaglavski district) The second most attractive cave in Eastern Serbia besides Prekonoška cave (Cvijić, 1987c, p.38, 39).		+

18	Prekonoška cave	The most attractive cave in Eastern Serbia (Cvijić, 1987c, p.41).	M.n. (2005)	+
19	Kučaj	The richest in ice caves of all mountains in Eastern Serbia (Cvijić, 1987c, p.48). The largest karst surface (286 km ²) is on Kučaj Mt.	NP (2013) Kučaj-Beljanica	+
20	Trem (Mt. Suva Planina)	The highest ice caves in Eastern Serbia at 1600-1700 m (Cvijić, 1987c, p.50).		
21	Ledena Peć Cave	On Ledeni Vrh peak, to the south from Suvodol, on Beljanica. The longest ice cave in Eastern Serbia (Cvijić, 1987c, p.51).		
22	Ledenica - ice cave on Rtanj Mt.	On the south side of Šiljak, in the village Mužinca. "It is the only ice cave in Serbia with the summer temperature below 0°" (Cvijić, 1987c, p.55).		
23	Stojkova Ledena (ice cave) on Kučaj Mt.	"Besides ice cave on Rtanj, Stojkova Ledena is the second richest in ice of all our ice caves (Cvijić, 1987c, p. 57)."		
24	Titelski plateau in Bačka	Small closed depressions, similar to sinkholes, in the loess and containing calcium carbonate. They are called <i>crovari</i> (Cvijić, 1987c, p. 133)	SNR Titelski breg (2013)	+
25	Seven groups of ponors of the river Borovštica	In Peštersko polje, ponors, ending in caves. This is an example of descending ponors (Cvijić, 1987c, p. 157).		
26	Valožje, Suva planina Mt.	In Serbia, jamas-zvekare are most numerous on the plateau of Suva planina Mt. Karst phenomena are most developed (Cvijić, 1987c, p.198)..		+
27	Western part of Kučaj mountain	An excellent example of aluvial sinkholes. "There are three ranges of large sinkholes, extending from east to west, in an axis from one to 1.5 km (Cvijić, 1987c, p. 199)."		+
28	Beljanica	"Along the northern slope of Beljanica there is a plain, which is slightly inclined in the south - north direction and furrowed by many sinkholes and valleys descending along with old tributaries to the river Mlava. It is the most typical case of all known to me; it made a strong impression on the population and only there the ranges of sinkholes and valleys were named slopes (Cvijić, 1987c, p. 259) "		+

29	Ledenica (ice cave) in Ždrebica (Valožje, Suva Planina Mt.)	"... and there (Ledenica in Ždrebica) is ice throughout the year (Cvijić, 1987a, p. 228)." Quite the contrary is written about the same ice cave (Cvijić, 1987c, p. 57).		
30	Perast	"... composed of pure travertine cascades (waterfalls, author`s comment), among them there are six major ... and all about 13 m high. (Cvijić, 1987a, p. 271)."		+
31	The valley of Velika Brezovića river	Particularly interesting (dry valley, author`s comment). "It is 6–7 km long and indented in the upper part with the Paleozoic schists, then the limestone. ... (Cvijić, 1987a, p. 276)."		
32	Nišava (the basin of Pirot, Bela Palanka, Niš and Caribrod)	"Now here in the central and eastern, as well as in southern parts of the Peninsula are there larger quantities of gravel and such typical terraces... (Cvijić, 1987a, p. 358)."		
33	Sićevska gorge	"From St. Petka and to the village Gradište there is a continuous and expressed karst area... where I could not observe the traces of rocky terraces (Cvijić, 1987a, p. 364)."	NP (2000)	+
34	Epigenetic valley on the river Pek near village Kaona	(Cvijić, 1987a, p. 370).		
35	Oxbow Kaonska bara	Between the gorge and village Kaona, an old riverbed of Pek (Cvijić, 1987a, p. 370).		
36	Gornjačka gorge	"However, the formation is closely related to the glacial climate (Cvijić, 1987a, p. 370)."		+
37	Bifurcation of Nerodimka	Near village Vata (Cvijić, 1987a, p. 387).	Strict Nature Reserve (1979)	
38	Crnica	"So Crnica has well-known <i>behind-the-hill gorge</i> , after which there is a small Sisevac basin (Cvijić, 1987a, p. 388)."		
39	Golija, Jankov kamen	A former glacier of firn character	Strict Nature Reserve (1957) NP Golija (2001)	+

40	Morava fault	"Dozens of kilometers long Morava fault stands out in the relief, stretching from Golubac on the Danube to Stalać gorge in the south (Cvijić, 1987b, p. 60)."		
41	Fold in Gostuša village	"...anticline and syncline in the Triassic limestone between Gostuša and V. Lukanja (Piroć, Visok) (Cvijić, 1987b, p. 66)."	NP Stara planina (2009)	
42	Vertical folds	"I've seen the most attractive vertical folds in our region in Dragačevo mountains, to the south from Čačak (Cvijić, 1987b, p. 69)."		
43	The three destroyed old craters	"..., Zvečan near Mitrovica, Veletin near Janjevo and Mrkonj (1045m) on the northeastern part of Kosovo, on the old border (Cvijić, 1987b, p. 185)." See page 188. "At the foot of Veletin there is an acidic and ferruginous spring Kižnica (Cvijić, 1987b, p. 188)."		+
44	The old crater of Đurđevi Stupovi, Novi Pazar	"Below Đurđevi Stupovi there is a sulfuric spa (49°S) (Cvijić, 1987b, p. 189)."		+
45	The traces of diluvial glaciation on Kopaonik Mt.	At Vučji Krš, on Gobelja and on the eastern side of Suvo Rudište in the cirque Krčmar (Cvijić, 1987b, p. 209)	Kopaonik National Park (1993)	+
46	Peak Vetren, Stalać hills	"Clearly visible gneiss with large crystals of feldspar (Cvijić, 1987b, p. 211)."		
47	A clearly visible border between Rhodopian mass and folded mountains (Carpatho-Balkanides, author's comment)	Around Koritnjak, which is above Niška Banja on the side in the direction of Suva planina, and including a valley Zaplanje		
48	Glama Zone	"Bare and rugged isolated peaks with escarpments on one side and gentle slopes on the other ... from Visoko to Vrška Čuka (Cvijić, 1987b, p. 247)."		

49	Veliki Krš	"It is completely breached only in one place, and the passage is called Vrata (the door) ... There is completely denuded limestone only in one place, and there emerges its ground layer, mica sandstones and schists (Cvijić, 1987b, p. 280)."		
50	Kačer, on Mačkat	"In Kačer there is chalk as well (Cvijić, 1987b, p. 357)."		
51	Švanjski bridge, Metohija	"At the place where Ribnik flows into the Beli Drim rises limestone lens about 2 km ... Drim river has epigenetically cut it by 15 m Limestone lens and layers around Švanjski Most stretch in the direction ENE-WSW. It is undoubtedly an exceptional direction. This limestone lens separates Đakovica valley from Prizren valley (Cvijić, 1987b, p. 391)."	N.m. (1986)	+
52	Mačkat karst levelled surface	"Of all Pliocene coasts the most important for our study is the one in Čajetina, which represents the end of Mačkat plateau (Cvijić, 1987b, p. 512). It is above Užice, about 850 m, with its upper edge or the coastal edge at about 940 m (Cvijić, 1987b, p. 511). Detailed research has shown that these seven or eight levelled surfaces of the Pannonian sea or lake abrasion terrace are of Pliocene age."		

ANALYSIS AND RESULTS

When taking a look at the Table 1 of geosites singled out by Cvijić as specific, one can notice the wide variety of sites and a clear indication of their characteristics. The classification of these sites according to geomorphological classification reveals the examples of surface karst relief forms, underground karst relief (speleological), fluvial relief, erosive forms of relief, aeolian relief, Paleovolcanic relief and glacial relief. Cvijić recorded 52 important geosites on the territory of Serbia.

Among these sites, the most numerous are karst phenomena, forms and areas (31 in total): 12 caves, 6 ice caves, 3 natural bridges, 2 holes in the rocks, 3 elements of the karst system (ponor, vertical cave, doline, etc.), 2 karst levelled surfaces and 4 gorges.

In addition to the above stated, 20 more geosites of different genetic classification have also been selected: 2 glacial sites (cirques), 3 structural elements (faults, folds), 2 paleovolcanic craters, 5 areas, 2 petrographic sites, 4 fluvial elements (epigenetic valley, bifurcation, oxbow lakes and waterfalls), 1 abrasion terrace and 1 hillslope process.

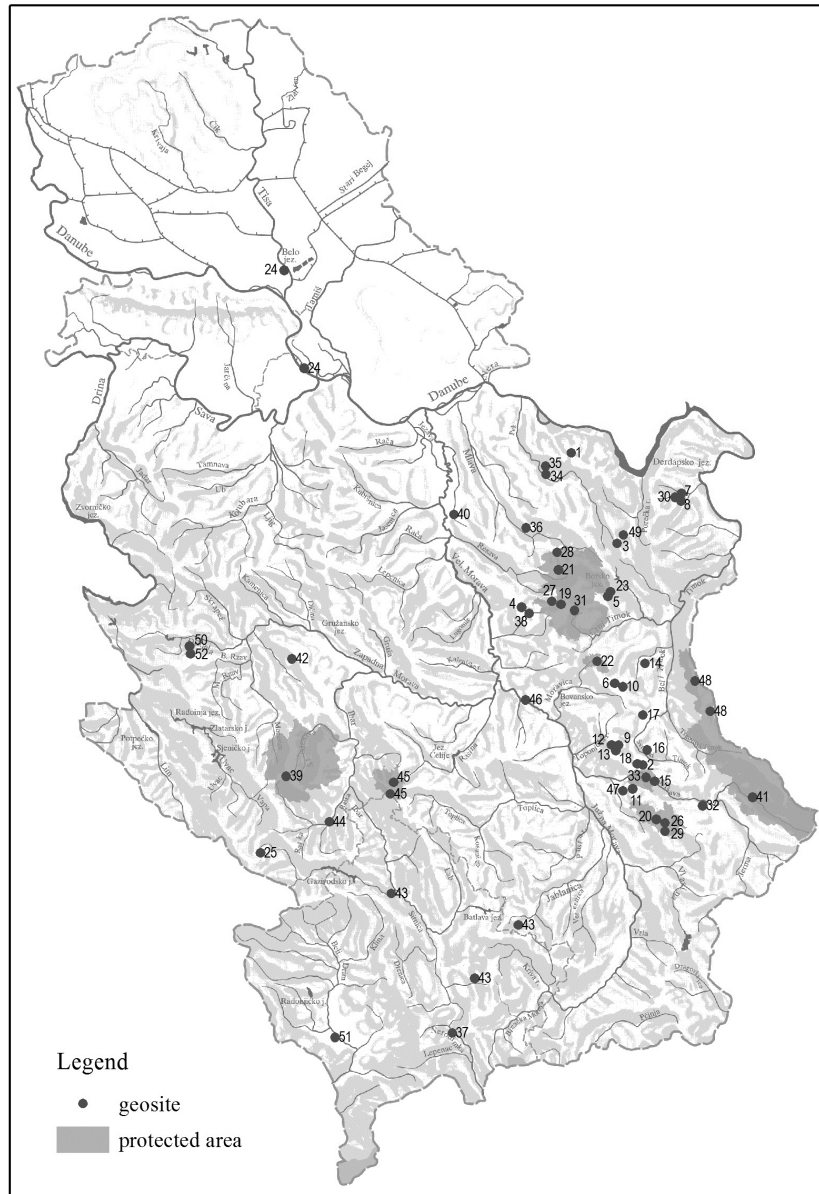


Fig. 1. Significant geosites from Cvijić's works. Numbers refer to those in Tab.1

Although some of those seemingly do not belong to the geoheritage group, certain interesting facts about particular sites were singled out, as unique parts of the geoheritage. Geoheritage differs from common geosites in its cultural segment, thus being a connection with tourism, and at the same time providing a sense of a true heritage.

The analysis has shown that of all selected geosites 43% are presently protected as a natural resource or as part of a larger natural resource. The significance of Cvijić's observations was evidenced by the fact that among the first protected geosites were the following: the cave Velika Pećina u Dubokoj (Dubočka cave) (1949); Lazareva cave (1949), Ravanička cave (1951), The cave in Perast (Samar cave) (1955), Samar on Perast / Prerast (1955), Mala Prerast on Vratna river (1957), Velika Prerast on Vratna river (1957), Golija, Jankov kamen (1957) and others.

An interesting fact was that Cvijić presented sites in his works according to their genetic classification, so that even when these sites were in the proximity they were stated separately, and such examples were the cave in Perast (Samar Cave) and Samar on Perast / Prerast; Prekonoška cave and Vasiljska cave; Mala Prerast and Velika Prerast on Vratnjanska river. Another interesting fact is that none of the five short and accessible caves that Cvijić particularly described is protected, although almost 30 caves in Serbia have been protected so far.

As a specific trait of geomorphological characteristics of Serbia, Cvijić also described ice caves, even four of them, and concerning Mt. Kučaj Cvijić stated that it was the richest in ice caves in Eastern Serbia. An interesting fact about ice caves is that they had been leased in the past. So Cvijić writes: "... and Rtanjska ice cave is leased by the authorities of the Municipality of Mužnica, and the ice is used at public gatherings and fairs, which are held in summer around Rtanj Mt. (Cvijić, 1987b, 49)".

"At the time when A. Boué visited Rtanj ice cave Ledenica, the ice had been extracted and transported to Niš, and now Ledenica has been under lease (in 1893 two farmers leased the cave for 10 dinars), and only these people have been extracting the ice and distributing it at the public gatherings and fairs (Cvijić, 1987b, 55)." The fact that Jovan Cvijić was an outstanding naturalist was evidenced by the following: "It is an interesting fact that around ice caves, especially on their sides and canals, grows most exuberant moss (Cvijić, 1987b, 57)."

However, it was not until 2013, when the first Study on protection of an ice cave, Tupižnička ice cave, was submitted to the relevant institutions in order to be designated as protected, that any of these caves were officially protected.

Although it is believed that geoheritage sites persist in time, especially if they are selected according to a physical characteristic, for example their height, in Cvijić's works there is a good example showing that this was not always the case and that the data are changeable. "Such is Mt. Šar Planina, with its peak Ljubotin (Ljuboten), which rises above Kačanik gorge; this peak has long been wrongly considered as the highest peak of the Balkan Peninsula, with its height of 3050 m. In 1890 it was clearly observed as far lower, afterwards its height was determined at 2150 m (Cvijić, 1987c, 408)."

CONCLUSION

The research on the elements of geoheritage in the works of Jovan Cvijić is a challenge for several reasons. In addition to a good style and technical terminology that was in most cases properly combined with the folk terms, the research presented in works is important due to the following facts:

- abundance of data contained in these works,
- understanding the valuation system that Cvijić applied and the sites he compared,
- comparability with the current state of these sites and the acquired knowledge about them today,
- revealing some of the less spectacular but important geosites or groups of sites that had complemented the development of the Earth's crust in Serbia,
- finding out about the fact that nature conservation, that is, the conservation of geosites was commenced with the sites Cvijić singled out as exceptional,
- the discovery of the geosites use by the former residents of Serbia, and the history of culture.

All these points suggest that we need to analyse the works of the founders of our geosciences in order to gain an extensive knowledge about their exceptional results and the comprehensiveness of their views.

ACKNOWLEDGEMENT: I would like to express my gratitude to Bojana Rakočević for the translation, and to Živko Vukasović for the map design.

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PHYSICAL GEOGRAPHIC RESEARCH OF ŠUMADIJA AREA FROM JOVAN CVIJIĆ TO DATE

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ABSTRACT: Šumadija, as the central Serbian region has favourable geographical position, with significant natural resources and economic development. Therefore, it was the subject of numerous studies from different geographical aspects in the past. Since the beginning of the twentieth century to the present day, several physical geographic studies in this territory have been made, and the first was carried out by Jovan Cvijić. Gently rolling relief of Šumadija, which consists of plains, valleys and mountains has been and remains the study subject of geomorphologists and geologists. Researchers were focused on the problem of Šumadija relief origin and initially the emphasis was on the abrasion process. The first researcher who expressed this conclusion was Jovan Cvijić (1909) in the publication *Lake plastics of Šumadija*. He repeated the same position in other articles (1921 and 1924), as well. Subsequent studies of this issue have caused revision of Cvijić's conclusions, but he made a great contribution to the fundamental research of this subject matter. This article presents an overview of physical geographic research of Šumadija area in the works of Jovan Cvijić, as well as significant subsequent research that resulted in the publication of numerous scientific papers, studies and monographs.

Keywords: Šumadija, physical geographic research, level surfaces

INTRODUCTION

Scientific research of Jovan Cvijić is based on field researches with detailed analysis of phenomena and processes in nature and society. Extensive literature about Jovan Cvijić scientific papers in Serbian and foreign languages point out that his study belonged to different geographic disciplines. His

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scientific papers in physical geography field can be divided into several groups: karst, glacial processes in the Balkan Peninsula and surrounding areas, present and ancient lakes on the Balkan Peninsula - their morphology, tectonics and geology

In great extent, Jovan Cvijić dealt with geomorphological research, which resulted in the publication of several studies and important scientific papers about relief genesis on the Balkan Peninsula. He published several articles in this field of research in German and French, and significant articles in the Serbian language are: *The form of the Balkan Peninsula*, Zagreb (1899), *Cryptodepression in Europe*, Belgrade (1902), *Lake plastics of Šumadija*, Belgrade (1909), *Rim relief and abrasive level surfaces*, Belgrade (1921), *Đerdap terraces*, Belgrade (1922), *About inverse relief*, Belgrade, (1922), *Abrasive series of Adriatic coast and epirogenic movements*, Belgrade (1922), *Fluvial level surfaces*, Belgrade (1923), as well as books *Geomorphology I* (1924) and *II* (1926).

RESEARCH OF RELIEF IN ŠUMADIJA

By studying the relief of the Pannonian Basin southern rim, Jovan Cvijić states that it is the best preserved within the borders of Serbia, and can be observed from Grdelica gorge to Belgrade. It is particularly well preserved in Šumadija area. Gently rolling relief of Šumadija, with level surfaces, valleys and mountains, has been and remains the subject of study of geomorphologists, who emphasize the importance of erosion processes, but also geologists from the point of tectonic processes. These studies were mainly focused on the problem of the genesis of Šumadija level surface. Studying the relief of Šumadija, Jovan Cvijić originally stated that these level surfaces had fluvial origin. However, later he concluded that the mentioned series are abrasive in origin, and he writes about it in the scientific paper *Lake plastics of Šumadija* (1909), and later in articles *Abrasive and fluvial level surfaces* (1921), *Fluvial level surfaces* (1923) and in books *Geomorphology I* (1924) and *II* (1926).

Based on field researches, he wrote in article *Lake plastics of Šumadija* (1909), "Observing this region from Avala, Kosmaj, Bukulja and Rudnik main attribute of it's plastic is perceived: surface is completely leveled in which afterwards river valleys are carved and by that, level surface is divided in well-known leveled Šumadija's steep planes and hills. From them solitary peaks and hills (Avala, Parcanski Vis, Kosmaj, Rudnik) rise looking like an island hills of Šumadija surface." Examining this territory Jovan Cvijić noticed that Šumadija's level surfaces can't be connected in one level

surface, since they are carved in each other and all of them are lower than Rudnik. They are mutually separated by sections and steep slopes, which transversely transition across the river valleys. According to these characteristics Jovan Cvijić concluded that the sections which separate the level surfaces are erosive and not tectonic in origin. He also states that they were not created by fluvial erosion. "Bends and fractures of Šumadija's terrain can't be related to any agents which are eroding and changing land today, however on the contrary, they are lines and traces of some very significant erosion, which disappeared. These are sea and lake of Pannonian Basin, which spread over Šumadija and further to south" (Cvijić, 1909).

In his research Cvijić concluded that the heights of certain coastal lines in Šumadija are almost constant, so that even in areas that are not studied in detail, coastlines can be marked with high probability. They are mostly better preserved than lake and marine sediments. On the Šumadija territory and further to south he differentiated seven major coastal lines. Among them are either terraces or parts of the central level surface. Old coasts are horizontal and nearly same height in Šumadija, while the lake level surfaces between them are gently inserted, one way inclined, usually to north, towards the Pannonian Basin, and somewhere to the east, to the Morava basin. By Cvijić's opinion, a coast line with its terrace makes group of forms which belong to a certain marine or a lake stage or phase. He named such group of forms after places where they are located or by areas where they are the best preserved. In that way he was marked: Mačkatska- (850 m), Metaljka- (780 m), Brezovačka- (600 m), Kačerska- (410–420 m), Ripanjska- (310–330 m), Pinosavska- (210–240 m) and Belgrade level surface (120–140 m). Also, bend at 110–120 m altitude is located below the lowest level surface. It is marked as the coast of Bulbuderski stage of the Belgrade phase.

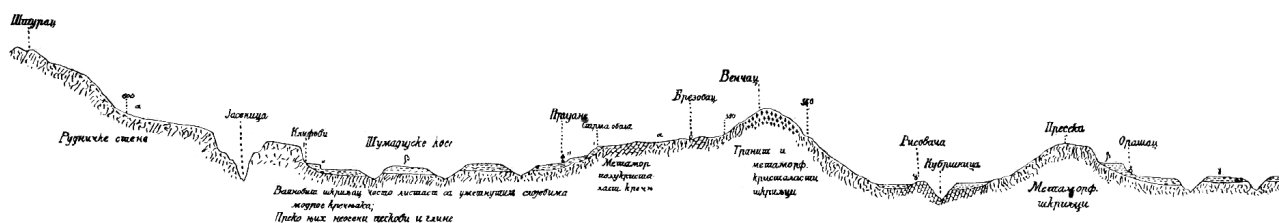


Fig. 1. Lake coasts and level surfaces from Rudnik to Orašac (source: J. Cvijić (1909).
Lake plastics of Šumadija, Belgrade)

By detailed examination, Jovan Cvijić determined that these level surfaces are abrasive terraces of Pannonian sea or lake in Pliocene age, which is retreated in eight stages. In the retention stages or level permanence stag-

es new level surfaces are carved in older relief, which are separated from each other with gentle or steep banks. "Especially typical level surfaces are near St. Mark church in Belgrade, in Zaklopača village near Danube, on the right side of the Točider Church towards the Banjica hill, at Turkish cape near Ripanj village, on Presjeci hill at Orašac village near Arandelovac, at Drača monastery near Kragujevac, in several places in Gruža, particularly in Vitanovac" (Cvijić, 1909). He also notes that in this area, coasts and cliffs cut at greater or lesser angle with the river flows, which leads him to the conclusion that they are not caused by fluvial erosion.

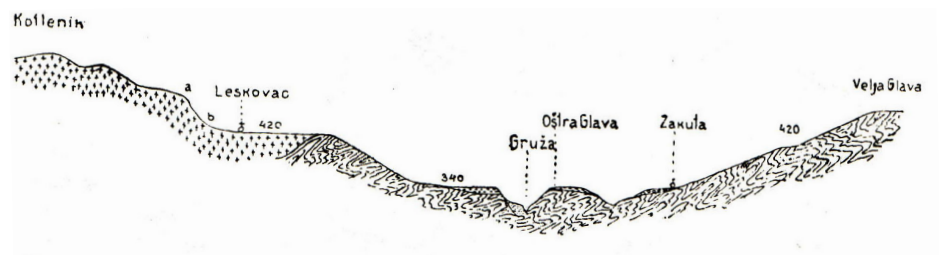


Fig. 2. Lake level surfaces in Gruža valley
(source: J. Cvijić (1926). *Geomorphology II*, Belgrade)

Conclusions by Jovan Cvijić on the Šumadija relief origin were accepted for many years. His students and all later researchers who have studied of the Pannonian Basin southern rim found abrasive traces in this territory, by which they were confirming Cvijić attitude. From foreign researchers only N. Krebs (1922) expressed disagreement with Cvijić explanation of Šumadija relief genesis, because he considered that "several lake terraces in first level of interior are surfaces which become leveled by lateral fluvial erosion" (Jovanović, 1953). Also, analyzing Krebs opinion, J. Žujović (1929) considers "that at least in the Šumadija, level surfaces are consequences of diluvial river erosion".

However, Cvijić's conclusions of the origin of Šumadija level surfaces was supported by his students and colleagues, including P.S. Jovanović (1922) in his doctoral dissertation *Lake relief rim of Belgrade vicinity*. Later, during fifties of the twentieth century, in scientific paper *Review of Cvijić understanding of abrasive relief around the Pannonian Basin southern rim* he revised Cvijić and his attitude of the Šumadija level surface genesis. In this article he expressed conclusion that they are originated by erosion, and denoted as fluvial level surfaces. He didn't completely rejected Cvi-

jić's opinion. However he pointed to some new facts which go in favor of greater importance of fluvial relief forms in Šumadija and impose the need for revision of Cvijić's conclusions. Based on new geological and geomorphological field research, this opinion was later accepted by other geomorphologists who dealt with this issue (Roglić, 1952, Jovanović, B. 1956, Lazarević, in 1957 and 1959, Zeremski, 1960; Stepanović, 1962; Marković 1965 and 1978, Petrović, 1988). It is significant to point out that P.S. Jovanović has done the revision of Cvijić's abrasive theory on Šumadija relief, based on K. V. Petković (1949), P. Stevanović & A. Eberzina (1949) and V. Laskarev (1950) geological data on absolute height and horizontal distribution of Pontian sediments.

Among the authors who have expressed a critical opinion on Cvijić's conclusions of abrasive relief in Šumadija, it is important to mention B.P. Jovanović (1956) who in doctoral dissertation *Relief of Kolubara river basin* concluded that the fluvial-denudation forms are more developed in this territory. He stated a numerous reasons for replacing Cvijić's conclusions about abrasive genesis of lower level surfaces with the new one - that they are fluvial-denudation level surfaces. R. Lazarević (1957) in scientific paper *Relief of Jezava-, Rajja- and Konjska river basins* concluded that "there are no lower Cvijić's level surfaces in relief of Danube region – sector Smederevo". In article *River plastics of Šumadija*, J.Đ. Marković (1978) concluded that all relief forms below 700 m altitude have river-denudation origin, and the evidences for that are height of Neogene sediments and numerous epigenies. In his opinion, it is possible that there are some paleo-abrasive forms in resistant rocks of former island mountains in relief of Šumadija. J. Roglić (1952) in article *Problems of the Neogene abrasive relief* states his opinion "that neotectonic movements have disturbed lower Pliocene deposits, which excludes possibilities of existence of undisturbed Pliocene coastal lines. On the disturbed base it can only exist younger fluvial forms".

Some authors considered Šumadija level surfaces genesis as combination of abrasion and fluvial-denudation processes (Lazarević, 1957; Jovičić, 1957). Thus R. Lazarević (2007) in his article *About relief in Šumadija* concludes that the relief of the Pannonian Basin southern rim is presented primarily with forms made by fluvial erosion, such river valley. However in this relief it can be observed abrasive forms - level surfaces and terraces on the Pannonian fault section above upper lake sediments border, i.e. above 500 m altitude. In Kalenička river basin, Ž. Jovičić (1957) found two abrasive level surfaces at 670–640 m and 570–540 m altitude and determines the border between the abrasive and fluvial relief at 500 m altitude.

As opposed to geomorphologists, geologists have noted that in relief structure of Šumadija endo-dynamic processes are occurring during the Neogene transgression and regression, as well as in the early Neogene (the Pliocene) and Quaternary, during continental period when in this area dominates fluvial-denudation process (Laskarev, 1927). In this context, P. Stevanović (1980) published important results in his scientific paper *Review of Neotectonics and paleogeography during Neogene in low Šumadija terrain*. Analysing stratigraphic relations on the area, erosive and erosive-tectonic discordance, transgression and regression he reconstructs presence of epyrogenic and orogenic neotectonic movements, where the last one left visible traces in relief as the forms of "vertical displacement of individual blocks". Recent results by P. Stevanović were the reason for M. Zeremski to examine morphostructural-tectonic features of level surfaces in Šumadija. As a result of this research he published scientific papers *Orthogonal morphostructures and oneway asymmetry - geomorphological indicators of neotectonic processes of low Šumadija area* (1982), *Regional distribution of oneway asymmetry and their importance for Neotectonic movements in Moravian part of the low Šumadija area* (1987), *Impact of morphostructure dynamics on morphology of low Šumadija area after Pont period* (1996) and *Morphostructures - the dominant morphologic forms of high Šumadija area* (2007). Neotectonic processes were studied on some smaller areas of Šumadija - in Lugomir and Belica river basins and in Danube region (Ršumović, 1971, 1984), as well as in Kragujevac and Gruža basin (Zeremski, 1983, 1985).

Geomorphological features and certain relief forms of some regions in Šumadija, were the subject of numerous scientific studies which have resulted in the publication of several articles, including: P. Jovanović (1953) - *Epigenic features of Topčiderska river basin and valley*; Ž. Stepanović - *Upper Levač basin* (1962), *Kragujevac basin* (1966), *Epigenies in Gruža river basin* (1970), *Natural features of volcanic massif Ješevac* (1972), *Natural geographical features of Crni Vrh nearby Kragujevac* (1973); B.Ž. Milojević (1951) - *Velika Morava valley - regional geographical research*; J. Marković (1967) - *Upper sector of Velika Morava valley*; B. P. Jovanović - *Relief of the middle and lower sectors of Velika Morava valley* (1969); R. Lazarević (1959) - *Fossil valley of Azanja*; M. Zeremski (1984) - *Levač and Belica basin*; Č. Milić - *Epigenetic features of Dičina and Dragobilj river basins* (1982), *Fossil and recent sediment deposits in Gruža river basin* (1983) and *Jasenica river basin* (1985). Among the geomorphological issues in Šumadija area especially are distinguished erosion processes, which have been the subject of study R. Ršumović (1986) in the article *Erosion and denudation processes in Šumadija* and S. Dragičević (2006) in doctoral dissertation *Geomorphological analysis of dominant erosive process as example of Kolubara river basin*.

Although karst relief cover relatively small area in Šumadija, it was the subject of study in the scientific papers of Jovan Cvijić and other researchers. In Belgrade territory, starting from the Košutnjak and Žarkovo spreads covered karst area with typical karst surface forms. Jovan Cvijić (1926) defined this area as a "Merokras around Belgrade". According to his opinion, "Karst area starts 5 km southwest of Belgrade, in the Žarkovo village and spreads in the Kneževac village, on Sremski Rt and Provalija in Sremčica village, on Lipovica and around Barajevo, Lisović and Manica village". Also, in the scientific literature the first data on the caves in Šumadija can be found in the book of Jovan Cvijić *Geomorphology II* (1926), where he mentioned Turski potok, the cave near Belgrade during his merokras research. Jovan Cvijić the first one who described dolines, sinkholes, caves, ponds and underground streams in this area, but without systematic morphogenesis explanation. He observed Belgrade merokras development within abrasive theory of the relief genesis on the Pannonian Basin southern rim (1921). Also, based on the research, P. S. Jovanović (1922) is concluded that the coastal terrace of the Belgrade phase is characterized by shallow alluvial dolines. Later B. P. Jovanović (1956) in his monograph *Relief of Kolubara basin*, described his research of Beljanica merokras in Dičina and Barajevska river basin. Also, D. Petrović and D. Gavrilović (1960), in the article *Karst relief of Belgrade vicinity* presented an overview of Belgrade merokras morphological evolution and evolution of karst relief forms, and Ž. Stepanović (1974 a) in monograph *Šumadija - natural beauty and rarities, and their significance* described karst relief of other Šumadija areas. Considerable research was carried out by R. Matejić-Rakić, which resulted in a master's thesis *Karst of Šumadija and its impact on the natural and anthropogenic characteristics of the geographic environment* (1979). In this thesis, the author distinguishes and defines 10 karst areas in Šumadija. Exploration of karst area in detail, geographical overview and the caves genesis in the Šumadija area gave D. Petrović (1982) in the article *Caves of Šumadija* and R. Lazarević (1987) in his monograph *Risovača*.

HYDROLOGICAL RESEARCH OF ŠUMADIJA

Considering numerous hydrological specifics of Šumadija, researches related to this issue were comprehensive and resulted in many hydrological studies and scientific paper about Šumadija entire area, as well as for some specific river basins. Some researches included also earlier Cvijić studies of Šumadija. Also, in certain publications some of Cvijić scientific papers are mentioned. Special significance for groundwater research in Šumadija area

has monograph by M. Komatina (1976) - *Hydrogeology of Šumadija*. Based on these knowledge and dozens of drill hole, paleorelief is mostly reconstructed, geological and hydrogeological structure of these territories is established, as well as the certain sediments characteristics. Except this monograph, it is significant the study of Group of authors (1953) – *Hydrosystem of Šumadija*, in which were analyzed the water management problems and opportunities for water transfer from Uvac river to Zapadna Morava, as well as article by M. Savić (1972) - *Information on the energy-water supply system Ibar-Šumadija*. Analysis of morphometric characteristics of river in Šumadija using appropriate software did V. Jovanović (1982). Except morphometry, in article *River network of Šumadija*, she analyzed the impact of certain physical and geographical features on the river network density. The same author has researched water resources of Šumadija (1986), while the geographical review of the lake in Šumadija was done by Ž. Stepanović (1969).

Certain rivers and river basins of Šumadija were subject of research in master theses and monographs. Among them are monographs R. Glišić (2002) – *Jasenica - morphological and hydrological characteristics*, Group of authors (2006) - *Morava* and A. Milanović (2007) - *Hydrogeographical study of Lepenica River*. Among significant scientific papers, it could be mentioned articles of M. Ocokoljić about altitudinal zoning of water in the Velika Morava river basin and some aspects of their protection (1987) and the water balance of Velika Morava tributaries (1993); M. Dedić (1986) on water supply planning and implementation to settlements in the Zapadna Morava river basin and Šumadija with Pomoravlje; D. Dukić about rivers of Belgrade and its surroundings (1960) and on water regime and water management problems in the Kolubara river basin (1974). Most researches about hydrological features of Šumadija were done by Ž. Stepanović, resulting in monograph *Hydrological characteristics of Kragujevac basin with special emphasis on water supply of Kragujevac* (1974 b) and other numerous articles. Based on many years of research, group of authors from the Jarslav Černi Institute for the Development of Water Resources published in 1955 a significant study *Deposition of sediment in the Grošničko artificial lake*.

In addition to scientific papers and publications about geomorphological and hydrological research of Šumadija, several monographs about were published, in which are presented general geographical overview of this region. Some of them are monographs Ž. Stepanović (1974) - *Šumadija- natural beauty and rarities and their importance*; Ž. Jovičić (1994) - *Šumadija- central area of Serbia* and R. Glišić (2013) – *Šumadija- geographical review*, and from demographic and economic aspects monograph T. Radivojević (1932) – *Šumadija in the present and the past*; R. Jovanović (1988) - *Settle-*

ments systems in Šumadija. These monographs are a result of numerous studies from different geographical aspects, and in some of them Jovan Cvijić research in Šumadija area are mentioned.

CONCLUSION

Scientific research of Jovan Cvijić had a great contribution in setting basis and development of geographical research in our country and surrounding region. Not only in geographical disciplines, but also in the natural and social, he was the first researcher of the Balkan Peninsula. Some of his research in physical geography, among which is relief genesis in Šumadija are now outdated. However his basic preferences remained in effect and have been used in a numerous researches that followed.

After establishment of the Geographical Institute SAS (1947), there was an idea to research the entire Pannonian Basin rim, considering the large number of views on the relief origin in this territory. The idea was to evaluate existing and seek new evidence on the origin of the relief by establishing a joint research team. However, for political reasons, in 1948 this idea was abandoned. As new technical and technological capabilities are available, future researches would help to explain the origin of complex polygenetic relief along Pannonian Basin rim, and therefore also in Šumadija.

ACKNOWLEDGEMENTS: This paper is a part of the project 47007 III, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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EXPLORATION OF THE MLAVA RIVER SOURCE BY CVIJIĆ AND SINCE

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ABSTRACT: Jovan Cvijić was the first to describe the functioning of the Mlava Spring and the morphology of its main discharge channel (spring pool) in his early papers dedicated to the karst phenomena of eastern Serbia (1896). In his book "Geomorphology II" (1926) Cvijić also explained how karst springs work. From today's perspective, after nearly a hundred years, one can only conclude that Cvijić assessed the type and discharge regime of the Mlava Spring rather well and indicated what further exploration should focus on. To date, the conduits of the Mlava Spring have been explored up to a depth of more than 70 m, using contemporary methods and costly equipment. The findings corroborate and supplement those of Cvijić's. Apart from the fact that underwater speleological exploration of the karst conduits has been undertaken there, the Mlava Spring features the longest time series of observed water levels and discharges in Serbia. More precisely, the Hydrometeorological Service of Serbia established regular water level monitoring of the Mlava Spring immediately after the World War II (in 1949) and began monitoring its discharge in 1972. Monitoring has been in place ever since. In addition, the Department of Hydrogeology of the Faculty of Mining & and Geology has established discharge regime and groundwater quality monitoring at all major springs in the Beljanica massif. As such, Mlava Spring is one of the rare karst springs in Serbia that are systematically monitored; the data have been more than valuable for assessing karst aquifer regimes in eastern Serbia.

Key words: karst spring, regime, Mlava Spring, Jovan Cvijić

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INTRODUCTION

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Fig. 1. *Mlava Spring*



Fig. 2. "*Lake Žagubica*", source of the Mlava River (Cvijić, 1896)

Jovan Cvijić was the first to describe the source of the Mlava River in his early works (1896) dedicated to the karst features of eastern Serbia. He also noted and partly explained its specific and non-uniform discharge regime. From today's perspective, more than a hundred years later, one can say that he largely assessed the causes of the phenomena quite well. Recent research and current knowledge are a step forward in the understanding of the mechanisms that drive the discharge of Mlava Spring.

Since 1980, the hydrology of the Carpathian-Balkan karst, and particularly of the drainage area of Mlava Spring, has been the focus of many detailed research efforts (Stevanović, 1982–2007; Benderev, 1989–2005; Ristić, 1997–2007; Milanović, 2005–2015, etc.). An attempt is made in this paper to compare the research conducted since Cvijić's time and recap new facts and the knowledge acquired during the course of field investigations and analyses of speleological, hydrogeological and hydrological data on Mlava Spring.

Mlava Spring was designated as a hydrological protected nature monument by Žagubica Municipality on 6 July 1979. Following a protection status review, in 1995 it was designated as Mlava Spring Nature Monument by the Serbian Government. The public utility Belosavac from Žagubica manages this nature monument. Mlava Spring has been classified under Cultural Heritage of Exceptional Importance, Category I, which requires second-degree protection. The size of the protected area is 6 ha.

MAIN CHARACTERISTICS OF MLAVA SPRING

Mlava Spring is located at an altitude of 314 m and belongs to the group of deep siphon springs (Fig. 1). A funnel-like pool has been formed at the point of emergence, whose diameter is 25 m and depth 30 m. Its conduits likely reach as deep as 100 m. Part of the spring water flows to a nearby fish pond, while the remainder joins the Velika Tisnica (100 downstream from the spring), giving rise to the Mlava River.

Cvijić was the first to investigate and report on the morphology of Mlava Spring's discharge zone. He used a steel ball suspended from a rope to produce a cross-sectional view of Mlava Spring's pool (Fig. 2 and 3).

Nearly 120 years after Cvijić's initial sketches of Mlava Spring, underwater speleological exploration revealed that in the spring pool, at a depth of 30 m, there is a narrow conduit (diameter about 1.5 m), which

serves as an entrance to a deeper system. Exploratory diving has so far reached a depth of 73 m (Milanović, 2005, 2007).

The ascending type of the spring and the deep-seated karst conduits are indicative of a deep karstification base. The position of the spring is determined by a fault trending E-W, along which the northern block of the Beljanica massif has sunk (Fig. 4). Mlava Spring is situated at the point of contact between Urgonian limestones and the basal part of the Tertiary sequence. Congerian limestones of the Pannonian have been registered in the immediate vicinity of the spring, which are mostly eroded and occur as "patches" in the spring's hinterland.

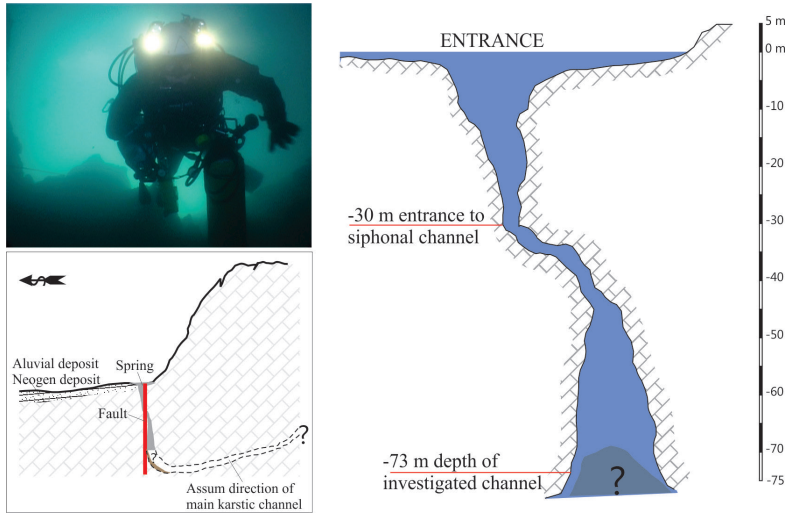


Fig. 4. Cross-section of Mlava Spring based on underwater speleological exploration

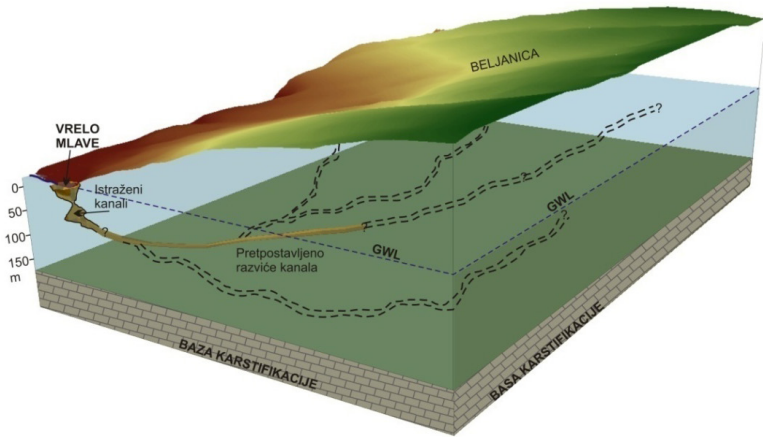


Fig. 5. 3D representation of determined and modeled karst conduits of Mlava Spring

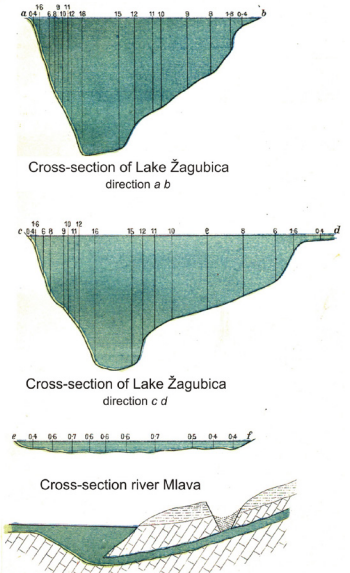
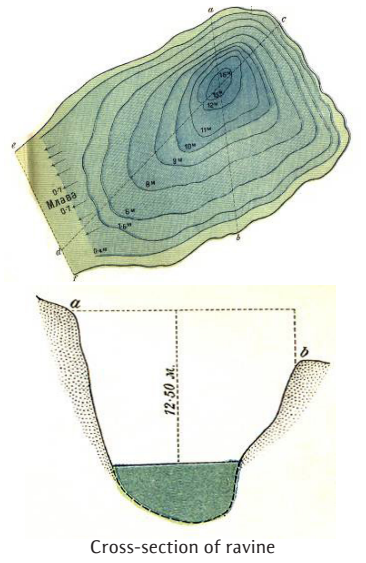


Fig. 3. Initial sketches of Mlava Spring zone by J. Cvijić, 1896



Cross-section of ravine

As one of the most significant springs of the Beljanica massif and given the estimated trending of Mlava Spring's karst conduits and the thickness of the carbonate rocks, the actual depth reached would be greater than 150 m, although hypothetically a conduit in this part of the massif might descend to a depth greater than 180 m or more (Fig. 5), according to karst conduit modeling.

MLAVA SPRING'S DISCHARGE PHENOMENON – CVIJIĆ'S EARLY NOTES

In *Springs, Mires and Waterfalls in Eastern Serbia* (1896), Cvijić classified Mlava Spring (a.k.a. "Lake Žagubica") under sinkhole-type, continually-discharging water basin with a permanent outflowing stream. He was also the first to portray the unusual phenomena associated with this spring's discharge regime. For example, he described its intermittent discharge as follows: "*Lake Žagubica features hydrographic disruptions of two types: its water level sometimes decreases to such an extent that there is no discharge, no Mlava, and the water remains in the basin, as a pond with no outflowing stream, and, furthermore, the color and transparency of the water change. The two phenomena need not occur simultaneously, nor are they periodic. The first phenomenon was more often observed by the older inhabitants of Žagubica, but it was also reported by Mrs. Mišković (J. Mišković in "Travels Across Serbia", 1874, 188, note by J. C.). On 14 June 1893 the water in the pond had shrunk to such an extent that its diameter was reduced, the Mlava did not rise from it and a number of ponds were created along a length of 180 m of the river channel; otherwise, this hydrographic phenomenon is not always associated with quakes, nor does it occur at a particular time of the year. It is a result of the fact that due to several causes (quakes, accumulation of clay and other sediments in narrow underground conduits), sub-surface caves, which deliver water to Lake Žagubica, may become blocked.*"

There is no exact data about the occasional, very rare discharge disruptions that have occurred since the time Cvijić conducted his research. Long-term spring discharge monitoring has never indicated total dryness. The reason for this could be the fact that discharge is monitored via water levels, that is, by means of a staff gauge, a part of which remains submerged in the pooled water even when there is no discharge.

Information about the occasional discharge disruptions is based solely on observations of the local population. One such case was reported in the mid-1980's and the most recent occurred in the autumn of 2002. Reportedly, one day in the late afternoon water stopped flowing down the channel below the spring and resumed during the night (there was discharge as of

early morning of the following day). The average duration of the discharge disruption is estimated at no more than 6–10 hours. A longer interval would threaten the fish in the nearby fish pond, and this has not happened to date. According to stories told from residents, there have certainly been more of these intermittent occurrences, but they were simply not recorded.

MONITORING OF MLAVA SPRING'S DISCHARGE REGIME

In Serbia, Mlava Spring is the karst spring that features the longest time series of observation. Water level monitoring at Mlava Spring began back in 1949, while hydrometric monitoring and generation of discharge curves started as late as 1972 (according to the official website of the National Hydrometeorological Service). The gauging station is equipped only with a staff gauge and regime monitoring has continued since then. However, there have been some interruptions, generally in the spring months, at times of high flows, when the surveyor likely could not access the staff gauge to record the water level.

The long-term average discharge of Mlava Spring from 1972 to 2014 is $1.754 \text{ m}^3/\text{s}$, and the average annual discharge ranges from $1.01 \text{ m}^3/\text{s}$ (1992) to $2.42 \text{ m}^3/\text{s}$ (1984) (Fig. 6). The average monthly high was recorded in 1984. (April) and amounted to $10.6 \text{ m}^3/\text{s}$, while the average monthly low occurred in October 1992 – $0.271 \text{ m}^3/\text{s}$. On average, the wettest month is April, with an average discharge of $3.62 \text{ m}^3/\text{s}$, while September is the driest (average about $0.78 \text{ m}^3/\text{s}$) (see Fig. 7). In the wettest trimester (March, April and May), Mlava Spring delivers slightly less than 45% of the total annual water volume, while in the driest trimester (August, September and October) the discharge drops to one-third or about 14% of the annual volume.

According to the analyzed time series, the spring discharge varies from a low of 215 l/s , recorded in 1973 (28 July to 2 August) to the record $19 \text{ m}^3/\text{s}$ registered on 24 March 1986. The high-to-low discharge ratio is almost as high as 100. Mlava Spring's discharge regime is generally governed by the precipitation regime. High discharge rates are typical of spring months, as a result of: (1) melting of the snow cover created in winter months with sub-zero temperatures, (2) spring rains, (3) simultaneous spring rains and sudden snow melt. In this regard, the dependency may exhibit only one peak (Case 3) or two or three peaks (Cases 1 and 2). Figure 8 depicts high flows in the spring, which are certainly a result of snow melt (end of February) and heavy rainfall (mid-March and first half of April).

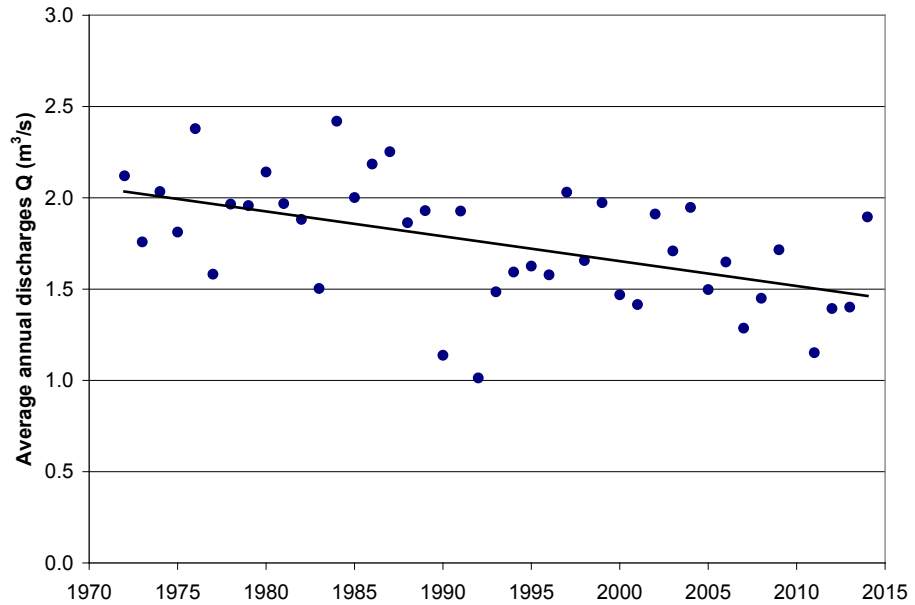


Fig. 6. Average annual discharges of Mlava Spring, 1972–2014

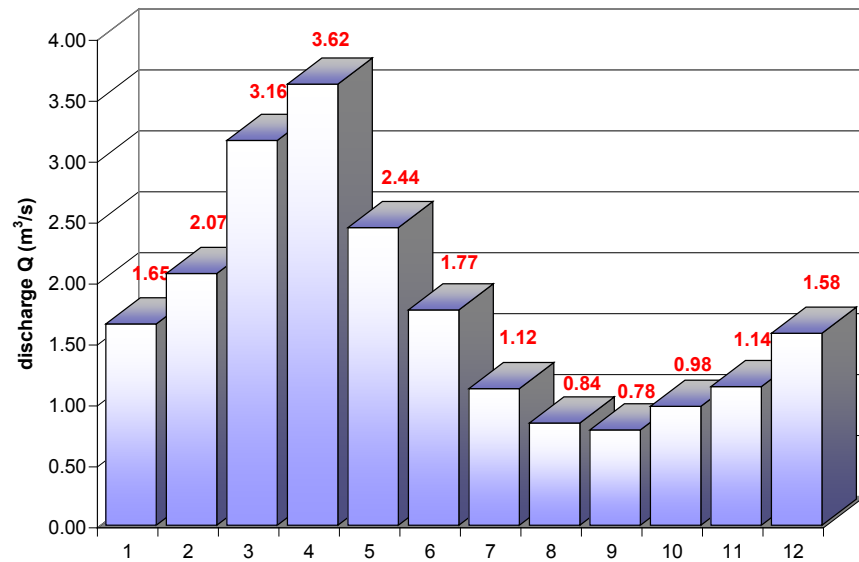


Fig. 7. Average monthly discharges of Mlava Spring, 1972–2014

In contrast, the summer months are a period of recession, when there is no rainfall, or only brief rainfall events of a local nature with no major impact on the discharge hydrograph (Fig. 8).

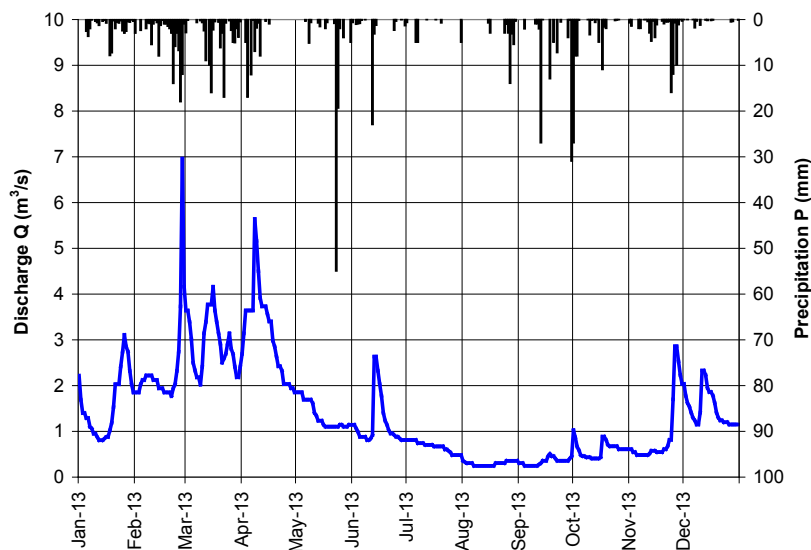


Fig. 8. 2013 Hydrograph of Mlava Spring, with daily precipitation totals recorded by the Crni Vrh Station in the same year

In August 2009, the Department of Hydrogeology of the Faculty of Mining & Geology of the University of Belgrade established discharge and groundwater quality monitoring at all major springs of the Beljanica karst massif (Stevanović et al., 2012). Mlava Spring was included, such that investigations have continued from Cvijić's time to the present day.

CONCLUSION

Mlava Spring, with its average annual discharge of $1.75 \text{ m}^3/\text{s}$, is certainly one of the most powerful karst springs in Serbia. Jovan Cvijić was the first to point out the significance of this spring. In addition to analyzing the regime of the spring, he conducted the first measurements needed to produce a cross-sectional view of the point of discharge of Mlava Spring. In this regard, it is noteworthy that the National Hydrometeorological Service first established water level and discharge monitoring of Serbian springs back in 1949 at this very spring, and that a number of Serbian authors have addressed various aspects of the spring in their doctoral theses (Stevanović, Ristić, Milanović). Given all of the above (*first spring cross-section, first exploration, monitoring, measurements, typical discharge regime, etc.*), Mlava Spring has become a symbol of karst springs in Serbia, especially those of the siphon type. As such, since Cvijić's time, Mlava Spring has gradually become a natural phenomenon with a strong identity recognized both in

Serbia and worldwide. In the natural heritage conservation study of Kučaj – Beljanica by the Nature Conservation Institute of Serbia, the nature monument “Mlava Spring” was left beyond the boundaries of the future protected area. This has prevented Mlava Spring from being assimilated into a larger protected area and losing its deserved identity and status symbol, contrary to the nature monument “Lazar Cave”, which has been integrated into the nature monument “Lazar Canyon”.

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JOVAN CVIJIĆ'S HYDROLOGICAL RESEARCH OF THE TIMOK RIVER BASIN (EASTERN SERBIA)

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ABSTRACT: In the late 19th century, Jovan Cvijić laid the foundations for the scientific study of the hydrological evolution in the Timok basin and eastern Serbia. In terms of hydrology, eastern Serbia is very diverse and significant in Cvijić's scientific research. He devoted great attention to the study of karst hydrography - underground waterways, wells, springs, waterfalls. In papers and monographs he presented scientifically valid and lasting knowledge of this area. The work shows his most important investigations and conclusions in this area, which are the result of field observations and measurements he performed. Even today, the research and works of Jovan Cvijić represent the basis for further study of hydrological and morphological phenomena and problems. Almost all studies in this issue after Jovan Cvijić are related to specific local phenomena. This paper is an attempt to present his work relating to the Timok basin and the Timok Region and beyond, the territory of Eastern Serbia.

Key words: Jovan Cvijić, hydrology, Eastern Serbia, Timok River

INTRODUCTION

Jovan Cvijić achieved most of his scientific work in the field of geomorphology. Given that water is one of the agents of creation and evolution of the various forms of relief, he also studied hydrographical objects. S. Stanković (2006) states: "He dealt with water in karst in details which enabled him to hypothesize about three hydrographical areas and thereby solve the evolution of dry, periodically and continuously flooded karst fields, define

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permanent, periodical and occasional springs, prove mismatch between orographical and hydrographical watersheds in the basins of numerous karst rivers, all with constant appreciation of the relationship between man and karst, which can be identified with the relationship and conditionality between human and water". In numerous papers and books he presented the results of his scientific research obtained by examining the expanses of eastern Serbia, and therefore many hydrographical phenomena, processes and structures in the Timok basin.

In terms of hydrology, eastern Serbia is very diverse and significant in Cvijić's scientific research (Stanković, 2006). The first important observation about the eastern parts of the country, mainly about the Kučaj Mountains, and about the Tresibaba and Tupižnica Mountains, he noted even during the students' scientific excursions with Jovan Žujović (Stojadinović, 2015). He returned to these regions several times, which resulted in the publication of numerous scientific papers on the karst terrains of eastern Serbia. This paper does not involve writing of Cvijić's biography or presentation of the whole of his work, but an attempt to present his work relating to the Timok basin and the Timok Region and beyond, the territory of Eastern Serbia and thus give a modest contribution to the celebration of the 150th anniversary of the birth of Jovan Cvijić.

SCIENTIFIC CREATIVITY DEDICATED TO THE TIMOK BASIN AND EASTERN SERBIA

The subject of Cvijić's research was often hydrography of the karst terrains. The most important of his works dedicated to, among other things, various hydrological phenomena and processes in the basin of the Timok are as follows:

- Ka poznavanju krša istočne Srbije (Towards the Knowledge of Karst of Eastern Serbia), Prosvetni glasnik, Belgrade, 1889
- Pećine i podzemna hidrografija u istočnoj Srbiji (Caves and Underground Hydrography in Eastern Serbia), Glas Srpske kraljevske akademije nauka, volume XLVI, page 1–101, Belgrade, 1895
- Izvori, tresave i vodopadi u Istočnoj Srbiji (The Springs, Peat Moors and Waterfalls in Eastern Serbia), Glas Srpske kraljevske akademije nauka, volume LI, page 1–122, Belgrade, 1896
- Površine rečnih slivova i dužine reka Kraljevine Srbije (Surface of river basins and rivers length of the Kingdom of Serbia) (with E. Cvetić, T. Radivojević, P. Janković and A. Maksić), Spomenik Srpske kraljevske akademije, volume XXXV, page 1–31, Belgrade, 1900

At the end of the nineteenth century J. Cvijić published two studies "Caves and Underground Hydrography in Eastern Serbia" (1895) and "The Springs, Peat Moors and Waterfalls in Eastern Serbia" (1896) and laid the foundations for the scientific study of the hydrological evolution in this field.

He devoted great attention to the study of karst hydrography - underground waterways, wells, springs, waterfalls, and presented their classification and names in extensive work: *The Springs, Peat Moors and Waterfalls in Eastern Serbia* (Serbian: *Izvori, tresave i vodopadi u Istočnoj Srbiji*). About the names of springs, he wrote: "They are most commonly called springs, source springs and small springs. Common names are given by way of rising or the spring form, such as: *klok*, *prskavac*, *samovrelica*, *vir*, *bezdan*, *grlo* (*grla*); by sound: *buk* (*bukovi*), *bobotalo*, *ropot*; by the smell of water: *smrdan*, by low and high temperatures: *studenac* and *studenka*, *banja* and *banjica*, and *banja* is always warmer than *banjica*. If they are caught in hollow tree trunks or underpinned, they are called wells and fountains, while they are *šopur*, *šopurići*, *šopke*, if they flow through ditch, and finally troughs, if they are beneath the channel in which water collects" (Cvijić, 1896).

Studying springs in Eastern Serbia, Cvijić singled out three types. Most numerous belong to ordinary springs that emerge from the caves or cracks and flow away normally. Other, much less common, are the springs at the bottom and the sides of the closed resurgence basins which they fill with water. In the third group of springs Cvijić includes quite rare springs - intermittent springs, which are related to cavities and curved channels in the limestone from which water flows intermittently and stops.

At the first group of springs of limestone mountains in eastern Serbia, the source springs that emerge from the caves and cracks in the limestone are most common. They appear at piedmont and the slopes of the limestone mountains. They are actually the underground rivers that come into view in the form of strong springs. These are the springs of the largest rivers of eastern Serbia, including the spring of the river *Crna Reka* or the *Crni Timok* (Figure 1). A common feature of these springs is that the anhydrous limestone masses end by escarpments and beneath them there are one or more cracks and caves from which the entire river flows out. Apart from these, the rivers created in this way usually have no other springs or if they have them, they are much weaker than the main spring so that it can be no doubt about the original spring of the river. Today, many settlements in the Timok basin are water supplied from such springs; *Knjazevac* is among them, and the *Sinji Vir* spring at the foot of *Tresibaba* is impounded for its water supplying.

Korenatac (Figure 2). The source spring of the Korenatac consists of three main headwaters: the Crnovrška River, the Čoštica and the Stanjanačka River. He states that the first river is richest in water and physically its original spring, starting with a source spring that lies in the cirque. In the hinterland of the cirque there is a part of the range of Stara Planina Mountain. The Crnovrška River begins with three headwaters: the Bučjanska River, the Gravaljosa and the Sokolova River, each of which is further composed of many smaller streams and all these water sprouts strongly erode the inside of the cirque. Cvijić concludes that for this reason our slopes of the Stara Planina are steeper than the Bulgarian.

“Cvijić presented tabularly the data for 164 springs stating the name of the spring and location, type of rock from which water rises, the absolute height and the water temperature” (Sibinović, 2015). Based on the conducted research, J. Cvijić recorded: “The Stara Planina is the richest in running water of all the mountains in eastern Serbia. The mean temperature of its springs, which are at a height of 1000–2 000 m, is 6.4 °C ... The height of the springs of eastern Serbia has prevailing influence on their temperature, and it can rarely be seen as it is seen on the range of Stara Planina “ (Cvijić, 1896). Springs around Rtanj are of uniform temperature from 9 to 10.5 °C. Of all the springs, the springs of the Lukavica and Mirovištica are the strongest. The Lukavica spring is under the western branch of Rtanj, and water comes out at the contact between limestone and sandstone. The Mirovištica spring is semi-circular basin, on which limestone edges water comes out of the temperature of 10.5 °C, filling the basin and flowing away as a strong river. Mean temperature of the observed springs of the Svrljiške Mts. is 10.5 °C. On the north side of the Svrljiške Mts., springs emerge either at the contact between limestone and phyllite with sandstone or from resurgence depressions and caves (Cvijić, 1896).

As the second type of springs, J. Cvijić singled out resurgence water basins, i.e. springs with small basins at the place where springs emerge to the surface. As a representative of this type of springs he mentioned Bare on the Svrljiške Mountains above the village of Gulijana.

Almost all the waterfalls in eastern Serbia are detailed in this monograph. Among other things, Cvijić also gave a description of the waterfall Bigar on the same small river, a tributary of the Stanjanačka River, which is one of the source spring headwaters of the Trgoviški Timok. From the spring to the mouth of the Stanjanačka River, the Bigar river valley is inclined by 80 m and whole filled with tufa. “The biggest waterfall 35 m high is located at the place where the tufa valley faces the Stanjanačka river valley In this little inclined escarpment, three snow white canvases of

foamed water can be seen, and three water mills among them. This is one of the most beautiful waterfalls in eastern Serbia, which moved by itself and artificially" (Cvijić, 1896). The Crnovrška river bed, the main headwater of the Trgoviški Timok, is characterized by many rapids that turn into cascades, and the biggest one is called Bobak. Its escarpment is 7 m high (Cvijić, 1896).

In the scientific study "Caves and Underground Hydrography in Eastern Serbia", the author points out the main characteristics of the movement of ground waters in karst of eastern Serbia and their relationship with the origin of the caves and the morphological evolution of the limestone terrains (Cvijić, 1895). Hydrographical features of caves J. Cvijić took as one of the criteria for their classification. He divided the caves into the river and dry. For the first he says that "ground waters are circulating through them and these waters are their main feature. Among the caves of this type there are those through which underground rivers are flowing the entire length, and these are the river caves ... All river caves have two openings: the upper in which the river sinks and is called the sinkhole and the bottom, from which the river rises and is called spring. These caves are, therefore, passable the entire length and the river that runs through them is called the underground river" (Stanković, 2006).

Cvijić noted that the dry caves are located mostly on the sides of the river valleys and escarpments of limestone mountains, sometimes in the escarpments below the highest mountain peaks. He believed that water was very important factor in the formation of these caves, which drained from the surface, and on the basis of sand, gravel and clay in some caves he concluded that streams and underground rivers flowed through them, too.

A separate section of the book is devoted to the manner of the emerging of springs and sources, estimation of the minimum and maximum abundance, morphometric data, data on water temperature. Among others, he investigated the Crni Timok spring, the Zlotska, Radovanska and Crnoljeviška springs.

In the paper *Ka poznavanju krša Istočne Srbije (1889)* (Towards the Knowledge of Karst of Eastern Serbia), J. Cvijić is dealing with karst relief and presents significant data on Prekonoška cave and underground course of the Svrljiški Timok. He devoted an entire chapter to the rivers in karst, concluding that one of its basic characteristics is anhydrous surface and the abundance of water in the depths of limestone mass. Based on the hydrological evolution and morphology of limestone terrains, several types of the river valleys are singled out (cut in the source spring, in the lower part closed - blind, half-closed, dry).

Table 1. *Surface of river basins and long rivers*

River	River length (km)	River basin surface area (km ²)
Beli Timok	105.8	2 161.72
Crna Reka	71.0	1 003.15
(Veliki) Timok	79.2	948.62
Svrljiški Timok	56.0	719.94
Trgoviški Timok	50.0	519.96
Grezanska	15.0	79.12
Žukovska	18.0	82.02
Zlotska	28.0	130.45
Vražogrnska	32.5	363.17

Source of data: Cvijić et al., 1900.

In article "Surface of river basins and rivers length of the Kingdom of Serbia", are divided two separate parts: surface area of the Kingdom of Serbia and rivers length in the Kingdom of Serbia ". Measurement river basin areas in Serbia was carried out in special sessions of the General Staff map of the Kingdom of Serbia, scale 1:75000. River lengths in km were measured with the curvimeter in the abovementioned special map of the Kingdom of Serbia (1:75000) created by General Staff. "Exceptionally is measured the entire Timok river basin in Serbia and also in Bulgaria" (Cvijić et al, 1900). In table 1 are presented morphometric data in Timok river basin, contained in mentioned article (Cvijić et al., 1900).

CONCLUSION

Jovan Cvijić has left a permanent mark on the culture, science and public life of Serbia. His works are a kind of legacy of the future.

He was a great connoisseur of relief and waters of eastern Serbia, which was his main attraction for scientific research for natural resources, the conservation of nature and ethnic specifics. In papers and monographs he presented scientifically valid and lasting knowledge of this area.

At the end of the nineteenth century, publishing voluminous works and studies, he laid the foundations of the scientific study of the hydrological evolution in this part of our country. Great attention he has devoted to the study of karst hydrography - underground waterways, wells, springs and waterfalls. The material he collected in the field was basis of his scientific work. The wealth of information on hydrographic facilities that he collected and gathered, even today is extremely useful to scientists in field research and cabinet studies.

ACKNOWLEDGEMENTS: The work is part of the project 47007 III funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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PLEISTOCENE GLACIATION OF MT. PROKLETIJE IN PLAV–GUSINJE AREA

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ABSTRACT: Various approaches to Pleistocene glaciation research of Plav–Gusinje area of Mt. Prokletije are discussed, starting with the first published research papers, by Jovan Cvijić early in 20th century, until the present geomorphological research, more than one century later. The introductory part of the article discusses conditions and socio-political circumstances, possibilities, and therefore application of particular methodology in research. Main part of the article provides an overview of research and publications with key results. Except for the traces of Pleistocene glaciation, Plav–Gusinje area of Prokletije is specific as one of the very few sites on the Balkan Peninsula with the development of modern small glaciers. The main feature of the century long research are significant morphometric differences of reconstructed Pleistocene glaciers. Moreover, reconstructed Pleistocene glacial forms are often not in accordance with the equilibrium line altitude (ELA). That caused some former incorrect conclusions, which are even nowadays present in many scientific, professional and educational publications. Finally, the differences in reconstructed Pleistocene glaciation extent at different periods of research are elaborated, leading to concluding remarks which point out to reasons of incongruent result.

Key words: Pleistocene glaciation, modern small glaciers, Mt. Prokletije, Balkan Peninsula

INTRODUCTION

Prokletije Mts. are the south-eastern continuation of the Dinaric mountain range. The area surrounding the settlements of Plav and Gusinje is characterised by glacial morphology developed during the Pleistocene. The system of mountain river courses with deep valleys and former cirques in the hinterland, feed into the lake Plavsko Jezero (Plav Lake). Downstream

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from the lake, the Lim River is formed by the outflow from the lake and the affluents from the east. The largest part of this area is situated in Montenegro, while some parts are in Albania, including the the highest peak of Mt. Prokletije – Maja Jezerces (2697 m a.s.l.).

The tradition of scientific research of Prokletije Mts. glacial morphology is more than one century long. It was started by Jovan Cvijić, stopped in the second half of the 20th century, and continued only nowadays. This review paper lists the most significant contributions in this field, together with the main results, explaining also the social and political circumstances of exploration, both locally and globally, accessibility of particular locations throughout the analysed period, and the implications of these circumstances on the level of exploration. Remoteness, scarce population, together with two world wars and the subsequent cold war, in the conditions of tough border between Albania and former Yugoslavia in the second half of the 20th century, have kept this area far from the reach of scientists.



Fig. 1. Location of the Plav-Gusinje part of Prokletije Mts. (Milivojević et al., 2008)

JOVAN CVJIĆ – FOUNDER OF PLEISTOCENE GLACIATION RESEARCH OF PROKLETIJE MTS.

The studies of the Pleistocene glaciation of Prokletije Mts. in Plav–Gusinje area have a tradition lasting more than one hundred years. The first scientific paper treating this issue was published by Jovan Cvijić in 1903. Awareness about the existence of fluvio-glacial material transported from Prokletije to the region of Skadar, and observations of Prokletije from the surrounding

mountains, inspired Cvijić to make a hypothesis that the highest part of Prokletije was probably the most glaciated area of the Balkan Peninsula during the Pleistocene. He stated that it was “most probable that much larger glaciers moved from Prokletije Mts. towards the north, and that large moraines should be found around the settlements of Plav and Gusinje” (Cvijić, 1903). However, most probably due to political circumstances in that period, this hypothesis had to wait for another ten years to be proved in the field. It was not until 1913 (after the Balkan Wars 1912-1913) that he published his first field results about the explored landforms of Prokletije originating from Pleistocene glaciation – in the study named “Ice Age in Prokletije and the surrounding mountains”. Existence of very deep glacial valleys led to the conclusion that this was the “centre of mountain glaciation of the Balkan Peninsula during the Pleistocene” (Cvijić, 1913). On the other hand, Cvijić was not in a position to visit the feeding areas of the former glaciers, in the highest, most upstream parts of these valleys. Therefore these explorations were lacking the full insight into the necessary facts, and this problem remained for almost the whole century that followed, mostly due to safety risks for explorers and travellers in the highest parts of the mountain (border area with Albania). Problems of personal safety in Prokletije Mts. were described in the collection of papers “Jovan Cvijić and Prokletije” (edited by Lješević, 1994) and lasted until 2004, when strict controls on the border between Albania and Serbia&Montenegro were abolished. Today, there are no physical barriers for explorations (the border is not guarded), but the administrative problems remained. The area is divided between Montenegro on the north and Albania on the south, and although it is possible to stay in the field, the formal procedures for full range of scientific research (e.g. sampling) are still not clearly defined.

In the time of Cvijić, there were also the problems of imprecise topographic maps, which sometimes led the explorers to systematic mistakes, especially related to topographic elevations – one of the most significant elements for snowline reconstructions.

Cvijić mentions the zones of cirques that were oriented towards the Vrhoša glacial valley, Ropojana glacier (also called Vrulja glacier), Grbaja-Dolj glacier and Bogičevica glacier. He mostly named the former glaciers by the toponymes where the material of frontal moraines was found. Plav glacier is therefore the system of Pleistocene glaciers that were directed towards Plav. Cvijić reconstructed the length of the glacier from the most distant points in Rikavac and Širokar, all the way to the Plav moraine in the Plav terminal basin (Fig. 2), which measured 35 km. This length is cited even today by many authors. Finally, he gives the elevation

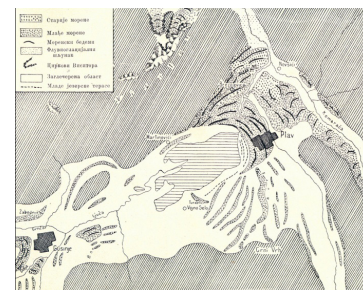


Fig. 2. Moraine next to the Plav Lake (Cvijić, 1913)

of the Pleistocene snowline, first at 1500-1550 m a.s.l., and further in the text at 1600 m a.s.l. (Cvijić, 1913).

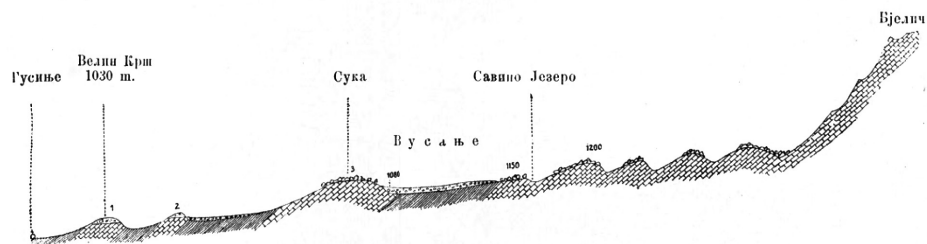


Fig. 3. Longitudinal profile of the Ropojana valley (Cvijić, 1913)

Cvijić made efforts to study the Plav glacier area systematically, in spite of the fact that he could not visit and inspect all its parts, applying the method of interview with the local population to learn about the parts he could not reach. He considered that all the accumulated material in the valleys of Prokletije, as well as in the Lim River valley, was of glacial and fluvio-glacial origin (Fig. 3). Several times within the text, he refers to this material as “conglomerate” (Cvijić, 1913).

EXPLORATIONS DURING THE 1920s AND 1930s

During the First World War, the Military Geographical Institute from Vienna (*Militärgeographischen Institutes in Wien, 1918*), has conducted the explorations on the territory of northern Albania, around the highest peak of Prokletije – Maja Jezerces, as well as in the border areas between Montenegro and Albania, in spite of the fact that at that time, the border was not precisely geodetically defined. The explorations were carried out during August and September 1918, with the aim of mapping for the Geological Map 1:200.000. It is supposed that the fieldwork was secured by the Austrian-Hungarian army. Roth von Telegd, who published part of the results of these explorations, showed the positions and size of the existing perennial snow/ice accumulations (Fig. 4, Telegd, 1926), which were many years later studied by Milivojević et al. (2008) and Hughes (2009). Besides the mapped snow accumulations close to Maja Jezerces peak, geological composition of the surroundings of the Plav Lake was given as well (Fig. 5).

After the First World War, the process of defining the border between the Kingdom of Serbs, Croats and Slovenes (predecessor of Yugo-

slavia) lasted for several years, which caused serious political instability. This fact caused a temporary cease of explorations, while the results of Telegd (1926) fell into oblivion.

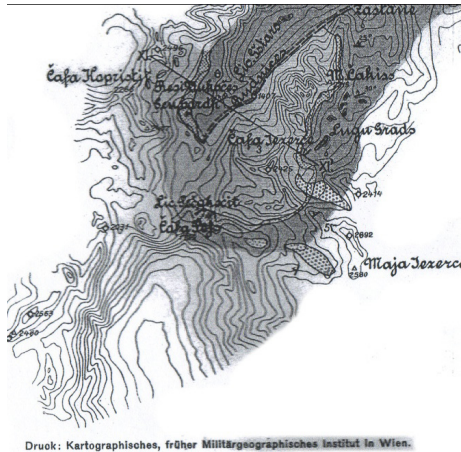


Fig. 4. Snow/ice accumulations at the foothill of Maja Jezerces peak (Telegd, 1926)

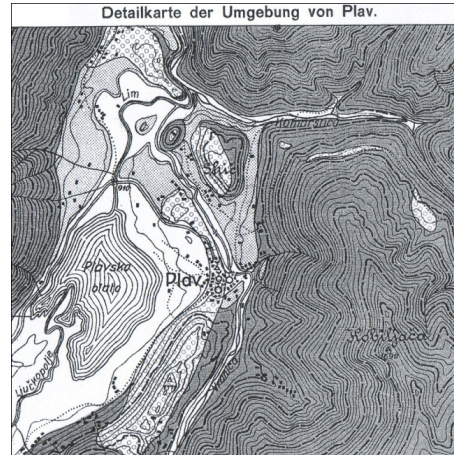


Fig. 5. Geology of the surroundings of the Plav Lake (Telegd, 1926)



Fig. 6. Reconstructed Pleistocene glacial relief (detail) (Milojević, 1937)

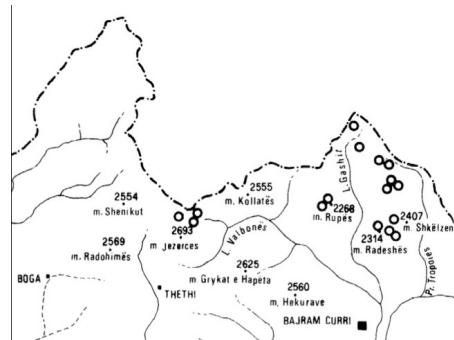


Fig. 7. Present rock glaciers in Albania (Palmentola, 1995)

B. Ž. Milojević (1937) continued the work of Jovan Cvijić in reconstructions of the Pleistocene glaciers and gave more details related to the higher areas of the mountain, mapping the cirques and glacial valleys (Fig. 6). As the access to high mountain areas in Albania was almost impossible, Milojević mapped the glacial landforms on the Yugoslav side of Prokletije, from Grnčar to Peć and Dečani. Without the opportunity to inspect the whole area above the Pleistocene snowline, Milojević did not have the complete picture of the former glaciation, so he did not elaborate this issue.

Instead, he adjusted his research to Cvijić's Plav glacier reconstruction and concentrated on detailed mapping of accessible moraines (distribution, orientation, dimensions, etc). One of the maps shows large-scale glacial forms (Fig. 6), and the longitudinal profiles of large valleys of Prokletije are given as well.

CONTEMPORARY RESEARCH OF PLEISTOCENE GLACIATION OF PROKLETIJE

Difficult political situation from the 1920s and 1930s continued after the Second World War as well. The border between Yugoslavia and Albania became a "tough border" guarded by the armies, and the access was forbidden for civilians. Thus, the whole area was isolated from the scientists, and this period is characterized by very rare publications. The area of the

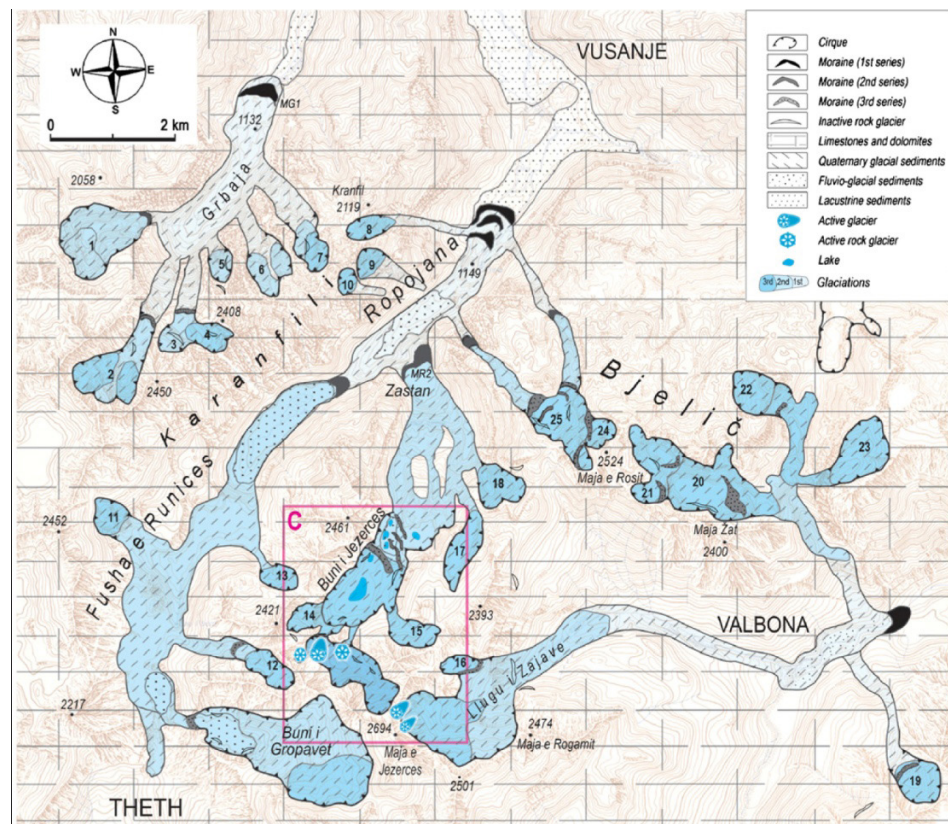


Fig. 8. Pleistocene glacial relief of Ropojana and Grbaja (Milivojević et al., 2008). The area C refers to Fig. 9

former Plav glacier system appeared again in literature only in 1995, when Palmentola published a paper on rock glaciers in northern Albania. Present rock glaciers are formed within the periglacial process, which is here linked with the research of the modern small glaciers (Milivojević et al., 2008; Hughes, 2009). Palmentola (1995) described and discussed 16 rock glaciers, three of which belong to the Ropojana branch (the system of the former Plav glacier), although the given coordinates are rather imprecise (as stated by Milivojević et al., 2008).

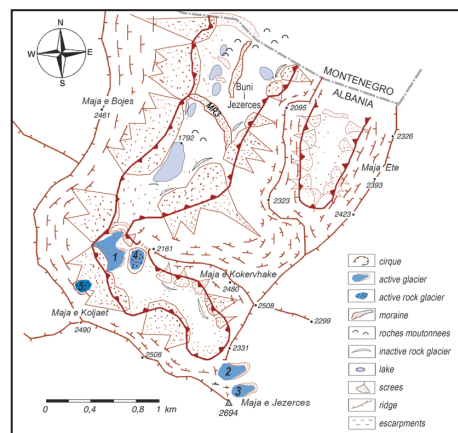
The new study on Pleistocene glaciation, glacier reconstruction and equilibrium line altitude in Plav-Gusinje area was published not earlier than in 2008 (Milivojević et al., 2008). The results are shown in detailed geomorphological maps – three series of moraines, pointing to three phases of Pleistocene glaciation, are shown on Fig. 8. This study for the first time takes into account the highest parts of the mountain (above the Pleistocene snowline) and shows that the Pleistocene glaciers did not reach the present Plav lake, but were considerably shorter (Tab. 1). The same paper gives the relative chronological reconstruction of three glacial phases in Plav-Gusinje area of Prokletije Mts. The maximal glaciation phase belongs to the Oldest Dryas (16.000-14.000 BP), followed by the Older Dryas (12.300-11.800 BP) and the Younger Dryas (11.000-10.000 BP). The relative chronology is based on analogy with other formerly glaciated areas of the Mediterranean and fits into the subsequent studies on Mt. Šar-Planina (Kuhlemann et al., 2009).

Table 1. *Positions of the equilibrium line altitude (snowline, ELA) of the Pleistocene glaciers of Ropojana, Grbaja and Bogičevica. A (m) – altitude of the frontal moraine; A (h) – altitude of the cirque outflow point (Milivojević et al., 2008)*

Glacier	1 st glaciation phase			2 nd glaciation phase			3 rd glaciation phase		
	A (m)	A (h)	ELA	A (m)	A (h)	ELA	A (m)	A (h)	ELA
Ropojana	1050	2450	1750	1350	2450	1900	1800	2450	2125
Grbaja	1020	2350	1685	-	-	-	1800	2350	2075
Bogičevica	1560	2200	1880	-	-	-	1970	2200	2085
snowline (ELA)	1793			1900			2095		

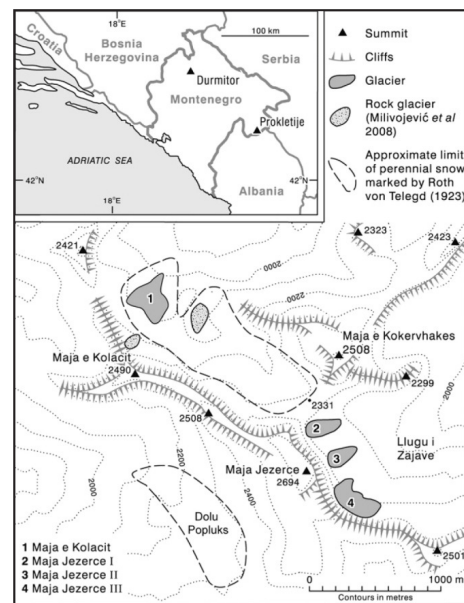
The same paper introduces the modern small glaciers, in the zone between the Maja Jezerces peak and Buni and Jezerces glacial lakes (Fig. 9). The paper gives their approximate dimensions, while the detailed monitoring of their sizes is carried out by the same authors in the period 2009–2016.

Since 2008, these small glaciers were studied also by Hughes (2009). On the basis of data on dimensions of small glaciers given by Milivojević et al. (2008), Hughes calculated other morphometric data (volume, average and maximum thickness). However, new observations of morphometry of small glaciers (Milivojević et al., unpublished data) show that the Hughes' input data are exaggerated and therefore the reconstructed dimensions (Hughes, 2009) are exponentially enlarged.



▲ Fig. 9. Pleistocene glacial relief and modern small glaciers in the valley Buni i Jezerces (Milivojević et al., 2008)

▶ Fig. 10. Modern small glaciers of Prokletije (Hughes, 2009)



DISCUSSION AND CONCLUSION

Opinions on glaciation of Prokletije Mts. in Plav-Gusinje area, starting from Jovan Cvijić to the present time, have undergone substantial changes. These changes refer both to present small-extent glaciation and Pleistocene glaciation. Present small glaciers were first observed by Telegd (1926), Cvijić's contemporary, although it was not determined that these were small glaciers, but only snow accumulations. As for the Pleistocene glaciation, Cvijić (1913) relied on the accumulation deposits next to the Plav Lake, describing them as moraines and thus calculating the length of the Plav glacier. At that time, he did not have the insight into the morphometric relations between the area with positive snow balance and the area below the Pleistocene snowline, which led to overestimated conclusions, which affected many subsequent studies as well (e.g. Milojević, 1937). Complicated social-political circumstances in the area, together with very difficult

accessibility of the highest parts of the mountain, caused the reduced data precision and reduced amount of research in general.

The most recent results show that the Pleistocene glaciers did not reach the Plav Lake basin and that their length was much smaller than previously thought. Instead of using the name Plav glacier, it is necessary to study separately the Ropojana glacier and the Grbaja glacier. The Ropojana glacier reached 12.5 km in length (13 km upstream from the Plav Lake) and not 35 km. It is clear that presently, when the conditions for research are more favourable, it is necessary to intensify the studies of the highest part of Prokletije Mts.

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HISTORY OF THE STUDY OF LANDSLIDES IN SERBIAN GEOGRAPHY

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ABSTRACT: The paper is based on analysis of published textual and cartographic materials. The history of landslide research in Serbia is analysed through the following criteria: paradigm, definition, diversification of the term and terminology. Chronologically, the paper covers the period from 1909 to 2014. All the works of authors - geographers who live and work in the territory of Serbia are treated as the "Serbian geography", regardless of the territorial scope of their research. In 1909, Jovan Cvijić in the work "Lake Plastics of Šumadija" for the first time scientifically defined the term landslides as autonomous geomorphological process and pointed to their importance in the formation of relief. From 1909 until today, several terms that marked this colluvial process have been used in the Serbian geography, such as plazina, bregolazina, urvina and klizište. In the same period divergent processes were noticed in terms of harmonization of the term, terminology, classification and division of landslides among geographers and geologists in Serbia. The first theoretical-methodological concept of landslides study is given by Petar S. Jovanović in the paper "Urvine in the vicinity of Belgrade". The author proposes the first morphological classification of landslides and systematization of lithological environment in which they arise (primary and secondary loose material). The term landslides in Serbian geography to date is characterized by reductionism, implying that the landslides occur only in loose rocks, and very poor diversification of the term itself.

Key words: landslide, geography, subject of research, methodology, Serbia

INTRODUCTION

In Serbia landslides are mentioned for the first time in the scientific and technical literature in the second half of the 19th century. Josif Pančić in

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1867 in the book "*Jestastvenica: mineralogija i geologija*" provides the first scientific interpretation of landslides in the national literature as an autonomous geomorphological processes and points to their importance in the formation of relief. The author states, "... but if it occurs in the depths of the earth, these layers are slowly washed, in which case upper layers that have thus lost the surface are falling, leaving smaller or larger recesses behind" (Pančić, 1867, 252). The author does not use any term used to refer to this process. In "classical" geographic papers of Karić (1887) and Milićević (1876, 1882), from the end of the 19th century, there are no statements that would point to processes or examples of sliding. Only in 1909, in the study "Lake Plastics of Šumadija" Cvijić for the first time indirectly introduces the term landslides in geography, indicating their importance to the formation of relief and the impact of regional geomorphological and lithological structures on their spatial distribution (landslides of Belgrade-Smederevo segment of the Danube valley). In the following period, landslides in geography are treated indirectly and sporadically. They can be found in the contents of university textbooks on the hill slope processes (Cvijić, 1926; Jovanović, 1950). Article by Petar S. Jovanović "Urvine in the vicinity of Belgrade", published in 1955, represents the beginning for the landslides to become the object of research in geomorphology and geography of Serbia.

DATA SOURCES

The paper is based on analysis of published textual and cartographic materials. Justification can be found in the words of Lucien Febvre, who said that history is undoubtedly constructed with written documents. Published scientific papers, monographs, MSc and PhD theses, textbooks, approved planning documents (spatial plans, etc.) were used as the first-order data sources. Landslides were treated in them either as the primary subject or as structural parts of publications. The second-order sources represented geomorphological maps on the basis of which data on landslides were directly obtained. A geomorphological map of Serbia, at scale 1:500,000 was used, as well as three sheets of geomorphological map at the scale of 1:100,000 (sheets Bela Palanka, Pirot and Zaječar). A historical perspective was analysed through the following criteria: paradigm, definition, diversification of the term and terminology. Chronologically, the review covers the period from 1909 to December 2014. All the works of authors - geographers who live and work in the territory of Serbia are treated as "- Serbian geography", regardless of the territorial scope of their research.

PARADIGMS IN THE STUDY OF LANDSLIDES

Landslides are the object of research of a large number of scientific disciplines such as geology, forestry, construction and geography. The differences lie in the subject of research. Each scientific discipline has its subject (ontological) which is defined as a set of objects, features, relations, processes (Grčić, 2001). Landslides are empirically evenly available to all disciplines, but their specific features and processes that will indirectly be determined depend on the research subject. When it comes to geology, e.g. engineering geology as a specialized area of expertise, its subject of research is genesis, statics and dynamics, monitoring, protection and rehabilitation of landslides. In forestry and civil engineering, the landslides are viewed solely from the perspective of landslide protection and rehabilitation. In the former case, the emphasis is on biotechnical measures, while the latter emphasizes geotechnical and hydraulic engineering techniques. In geographical point of view, it should first be said that landslides are primarily the objects of research in geomorphology, as a physical-geographical discipline. Petar S. Jovanović (1955) points out that the landslides are not only geomorphological, but also anthropogeographical and economic-geographical phenomena. Similar idea was given by Radenko Lazarević (2000), who points out that it is a characteristic of larger landslides. Based on the analysis of the published geographical papers on landslides, it can be concluded that the subject of research is not clearly defined. Explicitly, Jovanović and Lazarević dealt with the subject of research. Jovanović (1955) considers that the subject of research are spatial distribution and morphography of landslides, as well as determination of genetic factors of their morphological diversity. Lazarević (1951, 1977, 2000, 2001) stated that the subject of geographical studies are determination of genetic factors of landslides and their morphology and evolution. According to the object, features and processes of research, four paradigms are dominant in the works of geographers. These are the chorological, morphogenetic, quantitative-genetic and systemic paradigms. Certain methodological procedures are not typical solely to one paradigm, but they may be present in other cases.

Chorological paradigm in landslide research (as stated by Milošević, 2010) is based on profane qualitative inventory of landslides, without considering the factors of their spatial distribution. The analyses do not contain any elementary morphometric characteristics of landslides. Gno-seologically speaking, studies based on this principle are based exclusively on the sensualism (visual), without using large-scale maps, aerial and sat-

elite images. The papers of Jovičić (1956), Simić (1957), Stepanović (1962, 1971), Martinović (1977, 1980, 1981, 1983a, 1983b, 1986, 1990), Dinić (1979), Petrović (1988), Miljković et al. (2010) belong to this group.

Morphogenetic paradigm is based on qualitative and semi-quantitative analysis of local genetic conditions and the processes of formation of some landslides, as well as the factors of formation of certain morphological types. This principle is represented in the papers of Jovanović (1955), Lazarević (1957, 1969, 1977a, 2000, 2003), Zeremski (1964, 2008), Rakićević (1967), Rakićević & Stanković (1967), Bugarski et al. (1998) and Nešić & Milinčić (2004). Jovanović has carried out morphological systematization of landslides, differentiating the normal, current, wavy, sideways connected and gradual *urvina* (1955). In terms of lithological conditions, he distinguishes between primary and secondary material in which the landslides are formed. Primary material are clastic sedimentary rocks formed during the Neogene and later, while secondary material is regolith formed by weathering of compact rocks. This systematization was very rarely used in the further works of geographers, except for the papers of Jovičić (1956), Milošević et al. (2006) and Milošević (2010). It is interesting that several decades later, a similar classification of landslide material was published in geological literature as well, with different terminology. Lazić (1991) distinguishes between material which is a genuine sedimentary rock (corresponds to primary material of Jovanović, 1955), and the material which is a consequence of weathering (corresponds to secondary material in Jovanović's classification, 1955). Genetic classification of landslides proposed by Radenko Lazarević (1963, 1977b, 2000) had a larger impact among geographers. The author suggests the classification to stratigenic, morphogenetic and thermogenetic landslides. If a closer analysis is made, it can be noted that the systematization does not follow the same criterion. In the first two types, the criterion is the condition i.e., the slope of lithological structures (stratigene) or topographic surfaces (morphogene). In the case of thermogenetic landslides, the process, i.e. temperature fluctuation is taken as a reference criterion. If we start from the vertical temperature differentiation, it can be concluded that this type of landslides would be long to stratigenic type, only determined by temperature rather than sedimentation. Geological literature (e.g. Vlahović, 1991) follows the classification previously given by Savarenski (1935), which takes into account the relation between the sliding plane and lithological structure, and distinguishes the a sequent, consequent and insequent landslides. This classification was unfortunately never accepted by geographers. Lazarević (1957, 1963, 1975, 1977b) defines particular morphological elements within landslides, and groups these elements to erosional

(landslide scar, sliding plane) and accumulative (landslide hills, pseudo terraces, depressions). Zeremski (1964, 2008), Rakićević (1967), Rakićević & Stanković (1967) analysed the significance of landslide morphology for the formation of the lakes as well as for the location of certain historical events.

Quantitative-genetic paradigm is based on the instrumental collection, processing and application of numerical data related to the position and morphometric characteristics of landslides. It is also based on determination of thresholds of genetic factors (conditions and processes) and on determination of regularities of their spatial distribution. Instrumental inventory of landslides is done by using the GPS receivers (propagation of error from a few centimetres to 6 metres) and distance-meters or through specific GIS tools based on georeferenced large-scale maps, orthophoto and satellite images (Dragićević et al. 2008, 2009, 2013; Milošević, 2009, 2010; Mészáros, 2013). Depending on the selected model which defines the input data, areas that are potentially endangered by the process of sliding can be obtained using certain GIS tools – parametric analysis (Dragićević et al. 2009, 2012; Mészáros, 2013). In certain number of papers there is a geomorphological analysis, in which endangered areas are determined on the basis of morphological traces of sliding – the so-called landslide hazard zoning (Milošević et al. 2006; Dragićević, 2007; Dragićević et al. 2013). Landslides that are shown on the morphogenetic geomorphological maps are mapped by this principle, and the presented data depend on the scale. Geomorphological maps at the scale of 1:100,000 (Menković, 2008, 2010; Vasiljević & Menković, 2012) contain the information about the position, morphological elements (landslide slopes and the body of the landslides) and morphometry of landslides (sheets of Pirot, Bela Palanka and Zaječar). On the geomorphological map at the scale of 1:500,000 (Menković et al. 2003), it is possible to determine the relative surface and position only for the major landslides. Smaller landslides remained invisible at this scale due to generalization.

The system paradigm means that the landslides are not analysed in isolation, but are treated as a constitutive element of territorial structure that represents the set of relations connecting elements in geosystems (the system paradigm in geography was defined by Grčić, 2000). There is a reversible link between landslides and other spatial elements. Traditionally, the relation **space** → **landslide** is recognised as genesis, while the return relation (←) is recognised as a consequence. Elements of this paradigm are found in the papers of Jovanović (1955) and Lazarević (2000), but only in indications, without theoretical and methodological development. The first attempts with elements of theoretical elaboration are found in

the results of Milošević (2010). Within this paradigm the characteristic of multihazard is analysed, which involves genetically conditioned simultaneous occurrence of landslides and other natural disasters (e.g. earthquakes, floods) in a certain area. A landslide can be a primary process that most often generates flood or secondary process when it is conditioned by the earthquake (Milošević et al., 2013).

Geographical subject of research of landslides should be based on the analysis of those properties that directly or indirectly affect other objects and processes in the area and thereby influence their further development (integration, transformation, transposition). These are the spatial characteristics of landslides—location, distribution, morphology, and the quality of their relationship with the environment. With this subject of research, geographers-geomorphologists would prevent their distancing from geographical principles.

THE DEFINITION, TERM AND TERMINOLOGY OF LANDSLIDES

According to the content of the definitions of landslides given in earlier and current national geographical literature (Jovanović, 1950; Lazarević, 1963, 2000, Petrović, 1977, Petrović & Manojlović, 1997; Martinović & Golubović, 2004; Dragičević & Filipović, 2009), it is concluded that they occur only in loose surface layers. This feature was recognized by all the authors who dealt with this topic. In the monograph "Landslides", Lazarević (2000) explicitly states that landslides should be distinguished from the movement of solid rocks down the slope and that the process is "primarily a consequence of temperature changes, and only then of other physical-geographical factors" (p. 17). Analysing the relevant definition of landslides given by Cruden (1991, 28), by which they mean the "A movement of a mass rock, earth or debris down a slope", we can conclude that definitions of our geographers are reduced in terms of lithological environment. This definition of Cruden was also accepted by institutions that defined international standards in the study of landslides, such as WP/WLI - UNESCO (Working Group for World Inventory of Landslides) and IAEG (International Association for Engineering Geology and the Environment). Therefore, our geographers should observe landslides in wider lithological context in the future. This would mean that this colluvial process involves the movement of mechanically or tectonically heavily damaged petrified rock masses and loose sediments along the defined sliding plane under the influence of gravity.

Indications of such consideration of landslides can be found in Cvijić (1926). Beside the movement of loose material, he mentions the collapse

of solid rocks under the influence of gravity, although he does not use a single term which would include both processes. In the process of solid rocks downslope movement along vertical cracks, he introduces the term *urnis*, giving an example of Flims in Switzerland (in foreign literature defined as a rockslide). Cvijić's followers did not properly interpret this term in the following period. They identified *urnis* as a synonyme for rockfall (Jovanović, 1950; Lazarević, 1975; Petrović, 1977), which by definition does not have a defined plane of movement, but it is characterized by a free fall (Figure 1).

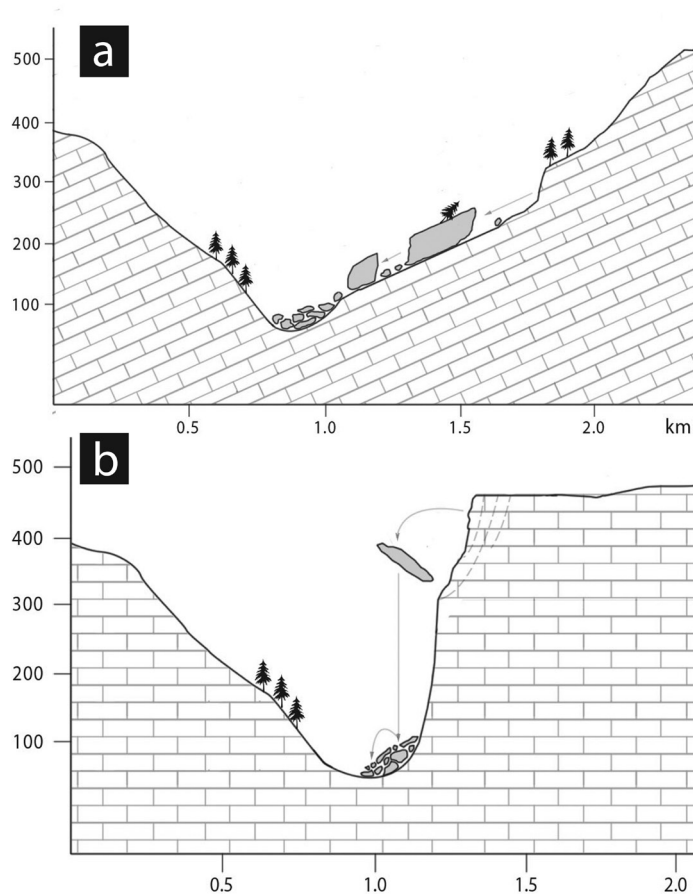


Fig. 1. Relationship of *URNIS* (rockslide) (a) and *ODRON* (rockfall) (b)

In the Anglo-saxon literature, classifications of landslides show a high level of diversification based on the way of movement and the characteristics of moved material (Cruden 1991; Cruden & Varnes, 1996; Hungr et al. 2014). Movement of solid rocks along a defined sliding plane is called a rockslide,

while the term for a free fall movement is a rockfall. Therefore, the Serbian term *urnis* corresponds to the English term rockslide.

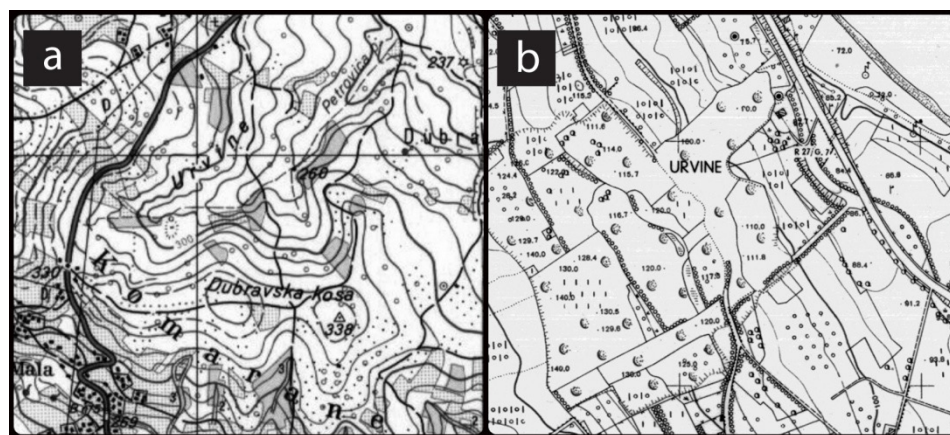


Fig.2 Examples of *URVINA* toponym. a) Komarane (Rekovac), TK 1: 25.000 531-1-3, Military Geographical Institute (1967-1972), b) Cigansko brdo (Grocka), DTK 1: 5000 Smederevo 11, Republic Geodetic Authority

Usage of the term landslide in Serbian geography shows some discontinuities. Cvijić (1926) uses the terms *plazina* and *bregolazina* that were accepted in the geological literature of that time (Žujović, 1923). The two terms are not synonyms, as it is often interpreted (e.g. Jovanović, 1955; Jovičić, 1956). Instead, *bregolazina* is quantitative term for *plazina* of larger dimensions (Cvijić 1926; Milojković, 1927). Jovanović (1950, 1955) introduced for the first time the term *urvina* as a synonym for previous term *plazina*, stating that "... people in Šumadija call the occurrence of loose soil sliding *urvina*, and we believe that it should be its scientific term" (1955, 140). This term is known only in the geographical literature. In other disciplines dealing with the study of landslides, this term has remained unknown or with different meaning. In Serbian geology, the term *urvina* indicates the rockslide, and it is even claimed that some authors mistakenly use it for landslides (Mitrović, 1978). Confirmation of adequate Jovanović's use of the term *urvina* can be found in toponomastics. A large number of localities in central Serbia bear this name, and the morphological elements of landslides are present in the topography (Figure 2). Lazarević (1977b) proposes to reject the term *urvina* and introduce the term *klizište* (landslide). As justification, he states that all other scientific and technical disciplines accepted this term. Further insistence on the term *urvina*, although it is present in people's language, would result in some kind of isolation of geographers and lack of understanding

among professionals of different disciplines. Today, the term *klizište* (landslide) is dominantly used in the Serbian geography, but the archaic term *urvina* is occasionally present as well (Petrović & Manojlović, 1997).

CONCLUSION

After analysing the geographic theoretical and methodological apparatus, which is applied during the last hundred years of landslide research, the following can be concluded:

1. The subject of research is generally not clearly defined. In a large number of papers, the subject of research is closer to the neighbouring natural sciences rather than geography. The publications of descriptive character are deprived of the concrete subject. The general subject of geographic research must be taken as a starting point. In this context, geographers should study the spatial characteristics of landslides: location, spatial distribution, morphology and the quality of their relationship with the immediate environment, including humans.

2. As a result of unresolved subject of research, certain methodological problems appeared: a high degree of description deprived of any systematization and classification of data, the absence of instrumental exploration and use of digital terrain models (DTM) through GIS tools, for getting morphometric data and modelling. Starting from the year 2006, there was a significant methodological progress, when a large number of papers is based on the instrumental and quantitative methods taken from other scientific disciplines (Dragičević et al., 2008, 2009, 2012, 2013; Milošević, 2010; Mészáros, 2013). Methodological contribution of geography in the overall study of landslides should be a non-engineering approach. It is based on the study of perception, aspiration, preference and attitudes of people who are grounded in the culture, history and tradition (Grčić, 2000, 2001). The quality of the connection that exists between man and landslides in a certain area often cannot be explained apart from the subject (man).

3. As a consequence of lithologically reduced definition of landslides (incorrect premise that they occur only in loose material), the geographers failed to make the appropriate diversification of the notion of landslide (as opposed to geological and foreign literature). With the extension of lithological context of landslide development to solid rocks as well, *urnis* should no more be treated as a synonym for rockslide, but as a qualitative determinant for the landslide that developed in a broken solid rock mass. Lithological systematization of landslides given by Jovanović (1955) is in a

certain way accepted by geologists, not through direct citation, but through adoption of the same principle given 35 years later by Lazić (1991). Thus, the significance of Jovanović's (1955) observations and methodological approach is acknowledged.

4. Multi-disciplinary work is the imperative and it should eliminate isolation tendencies, to which the Serbian geography was prone in the past. Inferiority, which resulted from isolation, will be overcome by the clear definition of the subject of research and the methodological approach immanent only to geography. These elements can already be identified in some papers (e.g. Menković et al., 2003; Dragičević et al., 2012).

5. The term *urvina*, suggested by Jovanović (1955) is correct in terms of people's language. However, the Serbian geography did not have enough power and authority to impose it to other disciplines and practices. Therefore, we should accept the suggestion of Lazarević (1977b): to abandon the term *urvina*, and to accept the term *klizište* (landslide) in geography.

ACKNOWLEDGEMENTS: The work is part of the results of the project 47007 III funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

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THE CLIMATE OF KARST TERRAINS IN SERBIA

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ABSTRACT: Since Jovan Cvijić had not specifically dealt with climatology, we tried to determine the climatic specificities of karst terrains of Serbia based on the data collected for the period 1961–2010. For the purposes of this paper, the location of karst terrains in Serbia was determined initially. In addition to the basic information on climate areas (extreme air temperatures, average annual insolation, the mean date of occurrence of the first and last snowfall, the average number of snowy days and days with snow cover, type of pluviometric regime) where karst terrains are located, special attention is paid to the range of air temperatures and precipitation levels in these areas. For that purpose the data from 64 climatological stations and 426 rain gauges were analyzed. The results that are shown in this paper may represent a starting point for the development of fundamental and applicative studies that would serve to further the research of karst terrains of Serbia.

Key words: climate, air temperature, precipitation amount, karst terrains, Serbia

INTRODUCTION

Jovan Cvijić devoted a significant part of his scientific work to morphology and hydrology of the limestone terrains, that is, geography of karst. In numerous studies methodological and terminological bases were set up for exploration of karst terrains, surface and underground karst forms of relief (Petrović, 2000). On the occasion of the 150th anniversary of the birth of Jovan Cvijić, an analysis has been made on climatic features of karst terrains in Serbia. The intensity of karst erosion and the formation of karst relief are affected by many factors: physical-chemical properties of carbonate rocks, type of soil and vegetation cover, terrain morphology, but

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also climatic conditions, primarily the regime of air temperature and precipitation. This paper is the basis for further fundamental research of karst erosion, but also applicative studies for areas in the geological structure of which the carbonate rocks are represented.

DATA USED

Data on karst terrains are taken from the map of distribution of karst relief in Serbia, according to which the karst terrains, i.e. carbonate rocks are most widespread in the Carpatho-Balkanides of eastern Serbia and inner Dinarides of western Serbia (Menković, 1998). For the purposes of the paper, in order to facilitate the presentation of climatic characteristics, the karst terrains of eastern and western Serbia are singled out, where the karst terrains of western Serbia are conditionally divided into northern, central and southern part (Figure 1). Based on the distribution of mean annual air temperatures and precipitation on the territory of Serbia for the period 1961–2010 (Milovanović, Radovanović, Stanojević, Pecelj & Nikolić, 2016), annual temperatures and precipitation have been calculated for each of isolated karst areas, as well as the extent to which the average annual values range. Also, the climatic conditions of karst terrains are analyzed according to affiliations to climate areas, that is, types of climates for the territory of Serbia proposed by Ducić & Radovanović (2005).

The displayed values of climatic elements at the stations within climate areas were calculated for the period 1961–2010, and the shorter time series that were used due to lack of data have specifically been indicated.

CLIMATE CONDITIONS OF THE KARST TERRAINS IN THE AREA OF SERBIA

The Figures 2 and 3 show the karst terrains combined with the mean annual air temperatures and the mean annual precipitation on the territory of Serbia. The Figure 4 shows the karst terrains combined with the climate areas in Serbia.

According to this typology, three basic climate areas are recognised: A - continental climate, B - moderate continental climate and V - modified Mediterranean climate, with several subtypes or varieties within each area. Continental and moderate-continental climate are terms that are conditionally used, because of domesticated use of these names even in the scientific community. The values of the mean annual air temperatures

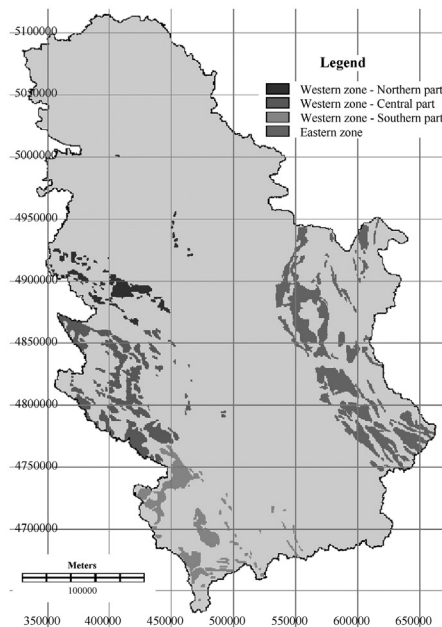


Fig. 1. Karst terrains in Serbia.

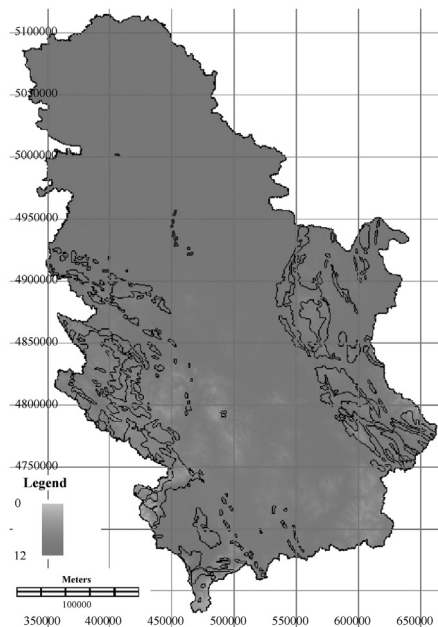


Fig. 2. Karst terrains and mean annual air temperatures (1961–2010) in Serbia.

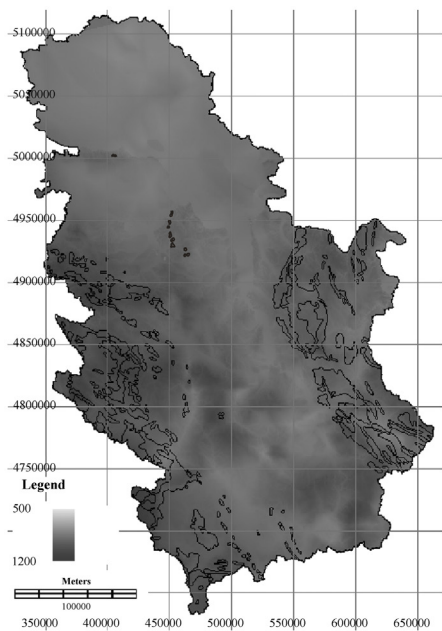


Fig. 3. Karst terrains and mean annual air precipitation (1961–2010) in Serbia.

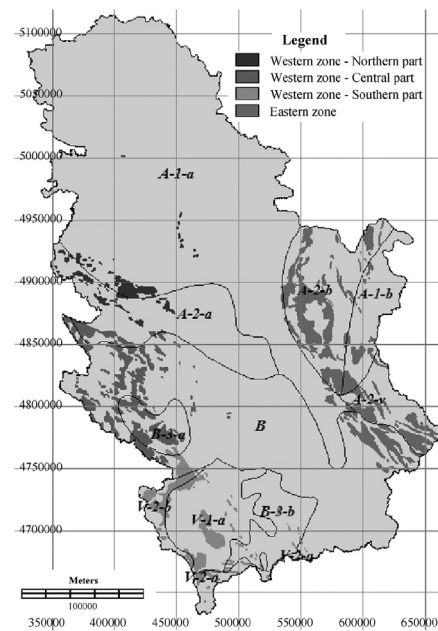


Fig. 4. Karst terrains and climate areas in Serbia.

of the karst terrains of eastern Serbia are from 4.44°C to 11.87°C, i.e. 9.29°C on average. The lowest value of the mean annual precipitation is 556.3 mm, while the highest is 992.9 mm, and the average annual precipitation is 750.2 mm. According to the typology of climates, the type A is represented here with three subtypes A-1-b, A-2-b and A-2-v, while the ultimate south-eastern part of karst terrains in this part of Serbia is partly within the climate B.

Characteristics of the Climate A-1-b Subarea

It covers the Timok valley from Knjaževac to Negotin and Kladovo. To view selected values of climatic elements in the climate A-1-b subarea, the data from three meteorological stations were used: Negotin (44°14'N, 22°33'S, 42 m above sea level), Zaječar (43°53'N, 22°17'S, 144 m above sea level) and Knjaževac (43°34'N, 22°15'S, 250 m above sea level).

For most of the subarea the mean annual air temperatures have values higher than 10°C, while lower values are on higher terrains (Figure 2). The mean annual air temperature is 10.5°C in Knjaževac, 10.7°C in Zaječar, while 11.5°C in Negotin, that is, annual values of air temperature increase from the southern parts of the subarea to the north and north-east. Absolute minimum air temperature measured in Zaječar is -29.0°C (13/01/1985), and -28.5°C in Negotin (24/01/1963). An absolute temperature maximum is 44.7°C for Zaječar (24/07/2007), whereas 42.6°C in Negotin (24/07/2007).

The mean annual precipitation amount ranges from 500 to 700 mm (Figure 3). The average annual precipitation is 613.8 mm in Knjaževac, 602.5 mm in Zaječar and 633.5 mm in Negotin. A transitional variant of pluviometric regime is represented in the northern part of the subarea and the Danube variant of continental pluviometric regime in the southern part.

The average annual insolation in Zaječar has a value of 2,004.8 hours, and 2,084.8 hours in Negotin. The average annual cloudiness has a value of 5.3/10 in Negotin, 5.6/10 in Knjaževac and 5.8/10 in Zaječar. The average annual value of relative humidity is 71.8% in Negotin, 74.4% in Zaječar and 77.5% in Knjaževac.

In Zaječar, the mean date of occurrence of the first snowfall is 24 November, the mean date of occurrence of the last snow is 10 March, the maximum measured height of snow cover is 66 cm (11/01/1985), the average number of snowy days is 28 days (1981-2010), and 46 days with snow cover (1981-2010). In Negotin, the mean date of occurrence of the first snowfall is 5 December, the mean date of occurrence of the last snow is 12 March, the maximum measured height of snow cover is 75 cm

(17/02/1986), the average number of snowy days is 26 days (1981–2010), and 44 days with snow cover (1981–2010).

The peculiarity of A-1-b subarea is the highest degree of continentality in relation to the whole territory of Serbia (Radovanović, Milošević & Belij, 2003). Also, more frequent anticyclone conditions in colder half of the year are one of the characteristics, which resulted in relatively stable weather conditions and lower air temperatures and longer retention of snow cover compared to other valley and depression parts of Serbia (Rakićević, 1980). In addition, in the period 1961–1990 on the territory of Serbia the highest air pressure values were measured in Negotin (1,015.3 mb) (Ducić & Radovanović, 2005).

Characteristics of the Climate A-2-b Subarea

It comprises the area under younger fold mountains from Đerdap in the north to the Niš Valley in the south. The data for the stations Crni Vrh (44°08'N, 21°58'S, 1,027 m above sea level) and Žagubica (44°12'N, 21°47'S, 314 m above sea level) were used for the representation of the values of climate elements.

The mean annual air temperature in most part of this subarea is lower than 10°C, and it is 7–8°C on the highest peaks (Figure 2). The mean annual air temperature in Žagubica is 9.6°C, and 8.0°C on Crni Vrh. The absolute minimum air temperature measured on Crni Vrh is -23.3°C (24/01/2006), and the absolute maximum is 36.5°C (24/07/2007).

Average annual precipitation values are 700-800 mm, while they are even above these values on mountain peaks (Figure 3). The mean annual precipitation is 641.5 mm in Žagubica and 797.8 mm on Crni Vrh. The Danube variant of continental pluviometric regime is represented.

The mean annual insolation is 1,965.3 hours in Žagubica, while it is 2,001.4 hours on Crni Vrh. The mean annual cloudiness has a value of 6.0/10 in Žagubica and 6.1/10 on Crni Vrh. The average annual value of relative humidity has a value of 78% on Crni Vrh and 80.5% in Žagubica.

On Crni Vrh, the mean date of occurrence of the first snowfall is 10 November and the mean date of occurrence of the last snow is 20 April, the maximum measured height of snow cover is 167 cm (25/01/2000), while the average number of snowy days is 67 (1981–2010), and 123 days with snow cover (1981–2010).

In addition to the microclimatic level, the influence of Lake Đerdap does not reflect in the values of climatic elements in the A-1-b subarea (Radovanović & Milovanović, 2003).

Characteristics of the Climate A-2-v Subarea

It includes Svrliške Planine Mt. and the Stara Planina Mt. The data for the stations Dimitrovgrad (43°01'N, 22°45'S, 450 m above sea level) and Pirot (43°09'N, 22°36'S, 370 m above sea level) were used for the representation of the values of climatic elements.

The mean annual air temperature decreases with increasing altitude and has a value of only a few degrees in the highest parts of the Stara Planina Mountain (Figure 2). In Dimitrovgrad, the mean annual air temperature is 9.9°C, while the absolute minimum measured air temperature is -29.3°C (25/01/1963), and the absolute maximum is 41.4°C (24/07/2007). The mean annual air temperature is 10.9°C in Pirot.

In the lower parts, the mean annual precipitation amounts are 700-800 mm, while in the highest mountainous terrains they are even over 900 mm (Figure 3). The average annual precipitation is 643.0 mm in Dimitrovgrad, and 599.5 mm in Pirot. The Danube variant of continental pluviometric regime is represented.

In Dimitrovgrad, the average annual insolation is 2,092.1 hours, the average annual cloudiness is 5.5/10, and 5.4/10 in Pirot, while the average annual relative humidity has a value of 72.6% in Dimitrovgrad and 75% in Pirot.

In Dimitrovgrad, the mean date of occurrence of the first snowfall is 2 December, the mean date of occurrence of the last snow is 22 March, the maximum measured height of snow cover is 79 cm (23/01/1963), the average number of snowy days is 49 (1981–2010), and 53 days with snow cover (1981–2010). In the highest mountainous parts of the Stara Planina Mt. snow appears in the first decade of October (Milovanović, 2010), and the average duration of snow cover in the highest parts is more than 200 days per year (Rakićević, 1980).

Given the mountainous relief in this climatic subarea, vertical climate belts are present: in the zone 1,200–1,800 m above sea level, the belt of cold and snowy boreal mountain climate stands out, while in the zone 1,700-2,000 m above sea level a transitional subalpine belt is represented (Belij, Ducić, & Radovanović, 2002).

In the karst terrains of western Serbia, the northern part, the average annual air temperatures have the values from 6.87°C to 11.45°C. The lowest value of the mean annual precipitation is 734.3 mm, the highest 1,058.9 mm, and the annual average is 917.4 mm. According to the typology of climates, the type A with the subtype A-2-a is represented in most of these terrains, while the subtype A-1-a is represented in small part, on the northern slopes of the Valjevo Mountains.

Characteristics of the Climate A-1-a Subarea

The karst terrains belonging to this subarea include the northern slopes of the Valjevo Mountains and the characteristics of this climatic subarea are presented for this area. The data for the station Valjevo (44°17'N, 19°55'S, 176 m above sea level) were used for the represented values of climatic elements.

The mean annual air temperatures decrease with increasing altitude and in the highest parts have the values of about 8°C (Figure 2). In Valjevo, the average annual air temperature is 11.2°C, the absolute maximum measured air temperature is 42.4°C (24/07/2007), and the absolute minimum measured air temperature is -28.4°C (24/01/1963).

In the highest terrains, the mean annual precipitation is about 1,000 mm (Figure 3), at the foot about 700–800 mm. In Valjevo, the mean annual precipitation is 792.1 mm.

In Valjevo, average annual insolation value is 1,977.9 hours, average annual cloudiness is 5.9/10, while the average annual relative humidity has a value of 74.5%.

In Valjevo, the mean date of occurrence of the first snow is 9 December, the mean date of occurrence of the last snow is 7 March, the maximum measured height of snow cover is 63 cm (12/02/1984), the average number of snowy days is 32 (1981–2010), and 43 days with snow cover (1981–2010).

Characteristics of the Climate A-2-a Subarea

The karst terrains belonging to this subarea extend from the Valjevo Mountains in the north to the Zapadna Morava valley in the south. The data for the station Požega (43°50'N, 20°02'S, 310 m above sea level) were used for the representation of the values of climatic elements.

The mean annual air temperature in the highest parts has the values of 6–7°C (Figure 2). In Požega, average annual air temperature has a value of 9.6°C, and the absolute minimum measured temperature is -30.7°C (13/01/1985), while the absolute maximum measured temperature is 41.0°C (24/07/2007).

Average annual precipitation in most part of this subarea is about 1000 mm, and even 1,100 mm in some parts (Figure 3). The Danube variant of continental pluviometric regime is represented.

In Požega, average annual insolation value is 1,534.8 hours, average annual cloudiness is 6.4/10, and the mean annual relative humidity has a value of 78.3%. Local factors, i.e. the valley-like position of Požega causes

that the measured values of insolation (cloudiness and relative humidity) are among the lowest (highest) for the territory of Serbia.

In Požega, the mean date of occurrence of the first snowfall is 23 November, the mean date of occurrence of the last snow is 17 March, the maximum measured height of snow cover is 55 cm (22/01/1963), and the average number of snowy days is 32 (1981–2010), and 58 days with snow cover (1981–2010).

Karst Terrains of South-Western Serbia

On the karst terrains of western Serbia, the central part, the annual mean air temperatures have values from 4.70°C to 11.18°C, i.e. 7.87°C on average. The lowest value of average annual precipitation is 612.2 mm, the highest 1 145.5 mm, and the annual average is 876.29 mm. According to the typology of climates, the climate type B is present here, and the Pester Plateau (Pešterska visoravan) stands out as a special climatic B-3-a subarea. The temperature regimes in different mountain belts behave differently, and some mountains (Tara, Zlatibor, etc.) can be viewed as individual climatic subareas. However, altitudinal zoning of climates is encountering numerous problems which cannot be resolved at the moment (Ducić & Radovanović, 2005).

Characteristics of B Climate Area

The karst terrains belonging to B area include the Internal Dinarides in southwest Serbia. The data for the station Zlatibor (43°44'N, 19°43'S, 1,028 m above sea level) were used for the representation of the values of selected climatic elements.

Observed for the area of karst terrains, the average annual air temperature reaches only 5-6°C in the highest parts. On Zlatibor, the mean annual air temperature is 7.5°C, while the absolute minimum measured air temperature is -22.8°C (23/01/1963), and the absolute maximum measured air temperature is 35.8°C (24/07/2007).

The average annual precipitation has the values of 800-1,100 mm, and even more on some mountains (Figure 3). On Zlatibor, the average annual precipitation has a value of 996.5 mm.

On Zlatibor, average annual insolation value is 1,973.6 hours, average annual cloudiness is 5.8/10, while the mean annual relative humidity has a value of 76.3%.

On Zlatibor, the mean date of occurrence of the first snowfall is 28 October, the mean date of occurrence of the last snow is 24 April, the

maximum measured height of snow cover is 92 cm (12/02/1984), the average number of snowy days is 66 (1981–2010), and 114 days with snow cover (1981–2010).

Characteristics of the Climate B-3-a Subarea

It comprises an area of the Pešter Plateau. The data for the station Sjenica (43°16'N, 20°00'S, 1 038 m above sea level) were used for the representation of selected values of climatic elements.

The Pešter Plateau is characterized by the lowest air temperatures in Serbia. For most of the subarea annual mean temperatures have values of around 6°C. The mean annual air temperature is 6.4°C in Sjenica. The absolute minimum air temperature in Sjenica is -35.6°C (13/01/1985), while the absolute maximum air temperature is 36.2°C (23/08/2007). The absolute minimum air temperature for Serbia was measured in the settlement of Karajukića bunari on the Pešter Plateau (-39.5°C, 13/01/1985).

Average annual precipitation has the value of about 800 mm (Figure 3). In Sjenica, the mean annual precipitation is 738.6 mm. The Danube variant of continental pluviometric regime is represented.

In Sjenica, average annual value of insolation is 1,933.2 hours, the average annual cloudiness is 6.0/10, while the mean annual relative humidity has a value of 78.0%.

In Sjenica, the mean date of occurrence of the first snowfall is 11 November, the mean date of occurrence of the last snow is 20 April, the maximum measured height of snow cover is 72 cm (08/03/2005), the average number of snowy days is 61 (1981–2010), and 103 days with snow cover (1981–2010).

On the karst terrains of western Serbia, the southern part, the annual mean air temperatures have values from 1.46°C to 10.96°C, i.e. 7.97°C on average. The lowest value of average annual precipitation is 567.9 mm, the highest 1,125.4 mm, and the annual average is 819.8 mm. The karst terrains in Kosovo and Metohija mostly belong to the V climate area, i.e. V-1-a, V-2-a and V-2-b subtypes, while the subtype B-3-b of the B climate area is represented on the Kosovo Plateau.

Characteristics of the Climate V-1-a Subarea

It is represented in the Metohija basin. The data from the stations Peć (42°40'N, 20°18'S, 498 m above sea level) and Prizren (42°13'N, 20°44'S, 402 m above sea level) were used for the representation of selected values

of climatic elements. The mean annual values of air temperature and precipitation were calculated for the period 1961-2010, while the mean annual values of insolation, cloudiness and relative humidity were calculated for the period 1961–1990.

For most of the subarea mean annual temperatures reach values higher than 11.0°C (Figure 2). In Prizren, the mean annual temperature is 12.1°C (the highest value for Serbia in the period 1961-2010). The mean annual temperature is 11.3°C in Peć. Positive winter air temperatures are also a peculiarity (1.3°C Peć, Prizren 1.9°C).

The average annual amount of precipitation decreases from the west (about 800 mm) to the east (about 600 mm) rim of the Metohija basin (Figure 3). The mean annual precipitation amounts are 789.6 mm in Prizren and 849.3 mm in Peć. A maritime pluviometric regime is dominant with the maximum precipitation in one of the autumn or winter months.

The average annual insolation is 1,983.5 hours in Peć, while 2,137.4 hours in Prizren (the most for the territory of Serbia). The mean annual cloudiness is 5.8/10 in Peć, while 5.6/10 in Prizren. The mean annual relative humidity is 70.0% in Peć and 68.0% in Prizren.

One of the peculiarities of V-1-a subarea is the climatic conditions in areas under the influence of air currents channelled down the gorges that connect the valley rim to the mountainous hinterland. Air flows channelled through the Rugovska Gorge cause better ventilation of Peć and higher mean annual air temperatures in Peć in relation to Đakovica which is located at 140 m lower altitude (Radovanović & Vasiljević, 2003).

Characteristics of the Climate V-2-a Subarea

It includes Šara Mountain. With increasing altitude the mean annual air temperature decreases, and in the highest parts it reaches only a few degrees above 0°C (Figure 2). At altitudes of 1,000–1,100 m January and February have negative mean monthly temperatures, at altitudes of 1,700–1,800 m mean monthly temperatures are negative from December to March, and in the highest parts of Šara, above 2,300 m, mean monthly temperatures are negative from November to April (Rakićević & Radovanović, 1994).

The largest part of this subarea receives annually 800–900 mm on average. Average annual precipitation in the highest parts of Šara reaches a value of 1,300 mm (Ocokoljić, Jovanović, Radovanović & Vemić, 1994). Mountain massifs affect the diversion of moist air masses from the west and reduction of annual precipitation sums. There are also precipitation inversions, and Dragaš can serve as an example which is sheltered by Ko-

ritnik and is in a “rainy shadow” of this mountain. The mean annual precipitation in Dragaš at 1,060 m above sea level is 807.4 mm. The maritime pluviometric regime is represented with the continental influences from the northeast.

Due to the mountainous relief, vertical differentiation of climates is expressed (Rakićević & Radovanović, 1994): transition zone from mild to alpine climate (1,000–1,200 m above sea level), high-mountain forest (alpine) zone (1,200–1,700 m above sea level), zone of alpine pastures (1,700–2,200 m above sea level) and high-alpine climate of rocks and talus (above 2,200 m above sea level).

Characteristics of the Climate V-2-b Subarea

It includes Prokletije. The lack of measurement and observation of meteorological parameters in this area greatly limits the analysis of climate conditions.

The mean annual air temperatures in the highest parts have a value of only a few degrees (Figure 2).

Average annual precipitation is over 1,100 mm (Figure 3).

Due to the mountainous character of the subarea, the height differentiation of climates is represented with certain limitations due to lack of data, the following height climate zones can be singled out (Radovanović, 1996): sub-mountain climate (600–1,500 m above sea level), mountain climate (1,150 to 1,750 m above sea level), high-mountain climate (1,750–2,250 m above sea level) and subnival climate (over 2,250 m above sea level).

Characteristics of the Climate B-3-b Subarea

It includes the Kosovo Plateau. The data for the station Priština (42°39'N, 21°09'S, 573 m above sea level) were used in the analysis of the climatic elements. Average annual values of air temperatures and precipitation were calculated for the period 1961–2010, while the mean annual values of insolation, cloudiness and relative humidity were calculated for the period 1961–1990. The mean annual air temperatures in most part of the subarea have values over 10°C (Figure 2). The average annual temperature is 10.2°C in Priština.

For most of the subarea mean annual precipitation sums have values of about 600–700 mm (Figure 3). The mean annual precipitation is 626.3 mm for Priština. Maritime and continental influences are intertwined in this area which resulted in transitional variant of pluviometric regime.

In Priština, the average annual value of insolation is 2,123.3 hours, the average annual cloudiness is 5.5/10, while the mean annual relative humidity is 71.0%.

CONCLUSIONS

It can be concluded that the territory of Serbia is characterized by a mosaic of different types and subtypes of climates. The paper gives a general overview of the climate characteristics of the areas in which there are karst terrains of Serbia. The development of karst processes is certainly difficult to bring in a relatively short temporal context in which meteorological, i.e. climate data are analysed. On the one hand, we have selected the quantitative indicators that are present on karst terrains. In contrast, the dynamics of climate changes is carried out independently of the spatial representation of such terrains. Therefore, we are confident that the results may represent a starting point for the development of a model that would serve to further research of karst terrains of Serbia.

ACKNOWLEDGEMENTS: This study was financially supported by the Serbian Ministry of Education, Science and Technological Development (Project no. III47007).

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SPELEOTECT: NEOTECTONICS RECORDED IN CAVES

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ABSTRACT: In terrains with high erosion rates it is often difficult to observe and measure active tectonics. Karst caves are natural laboratories that can preserve a variety of traces of environmental, geological and geomorphical processes. Available reports on neotectonics from caves often describe earthquake effects like broken dripstone (stalagmites, stalactites, and soda straws), rock falls (incision), specific sediment structures of cave deposits, and growth anomalies in speleothems. Here, we present the SPELEOTECT project which focuses a comprehensive and detailed study of the Quaternary tectonic activity and recent dynamics of micro-displacement along major fault systems of the Eastern Alps, registered in caves. We present further evidence for active faulting observed in caves, detailed microstructural analysis of the deformed flowstone and preliminary results of in situ measuring of the active faults. Some evidence for active tectonics in caves include, but are not limited to, distorted passages, broken boulders along faults, crushed and sheared flowstone. Present study aims to add to an archive for broader paleoseismic and neotectonic studies.

Key words: active tectonics, karst, cave, Austrian Alps

INTRODUCTION

Karst caves represent a unique environment that can preserve evidence of past geomorphical and geological processes. Especially in case of paleoseismic and neotectonic studies, this type of archive can play an essential role in understanding geological evolution and seismic hazard of an area (e.g., Forti & Postpischl, 1984; Lacave et al., 2004; Becker et al., 2006). As presented by Plan et al. (2010) conducting a case study in the Eastern Alps,

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paleoseismic records from karst caves are of high importance due to the general lack of surface expressions of neotectonic activity attributed to high erosion rates during the Quaternary.

Despite the fact that the paleoenvironmental research of karst caves has undergone a fast development in the past few years, particularly supported by advances in precise isotope measuring, including U/Th dating and paleoclimatic isotope studies (e.g., Schwarcz, 2006; Fairchild et al., 2006), topics in active tectonics in caves did not follow this trend. However, speleothems are capable of recording paleoseismic events (e.g., Forti & Postpischl, 1984; Becker et al., 2006) and even of providing constraints on their magnitude (e.g., Szeidovitz et al., 2008). Observed features include broken and tilted stalagmites, displacements of stalactite-stalagmite pairs, fallen stalactites, collapsed cave ceilings, and displaced gallery sections. Such features are referred to as *seismothems* (e.g., Delaby, 2001) or *speleothem seismites* (e.g., Kagan et al., 2005). However, it is very important to investigate the site very carefully, in order to rule out other causes of damage, such as ice flow, gravitational movements or human activity (Gilli, 2004; 2005).

Here we describe the Speleotect project, a comprehensive and detailed study of the Quaternary tectonic activity and recent dynamics of micro-displacements along major fault systems of the Eastern Alps, registered in karst caves. The main aim of this project is two-fold: (1) building a solid and broad database of the paleoseismic record of the Eastern Alps for regional earthquake hazard assessment, and (2) introducing the multidisciplinary study that can be implemented for understanding the seismic hazard in any karstic area. In the following text, we will briefly describe the regional neotectonic setting of Eastern Alps and the most notable effects of active tectonics in caves. Our contributions in the scope of the Speleotect project presented here are microstructural characteristics of sheared flowstone, and their implications for understanding mechanics of the fault friction, and fault gauge TM71 that measures in situ fault dynamics.

REGIONAL TECTONIC SETTING

One of the dominant neotectonic processes in the Eastern Alps is the Neogene and Quaternary lateral extrusion towards the Pannonian Basin. It involves gravitational collapse and tectonic escape, coeval with north-south shortening between the Adriatic and European plates. In the Eastern Alps, the 300 km long Salzach-Ennstal-Mariazeller-Puchberger (SEMP) fault accommodated a sinistral displacement of about 60 km during Tertiary

time. However, recent activity of this fault is questionable. Presently the Mur-Muerzsinistral fault is the most seismically active fault in the region, with 2 mm per year slip according to the GPS data. GPS observations provide evidence for eastward displacements of the easternmost part of the Alps toward the Pannonian region at a rate of 1.4 ± 0.2 mm/a relative to the European Platform relative to the Bohemian Massif (Bus et al., 2009).

Evidence for active deformation along SEMP and Mur-Muerz faults has been documented in the Vienna Basin, at the eastern margin of the Alps (Decker et al., 2005). However, there is a general lack of surface expressions of neotectonic activities in the Eastern Alps has been attributed to high erosion rates during the Pleistocene in this high-relief region (Plan & Decker, 2006). Plan et al. (2010) reported the first evidence of tectonically broken speleothems in the Eastern Alps (Austria), which have been studied in a cave within the SEMP fault zone.

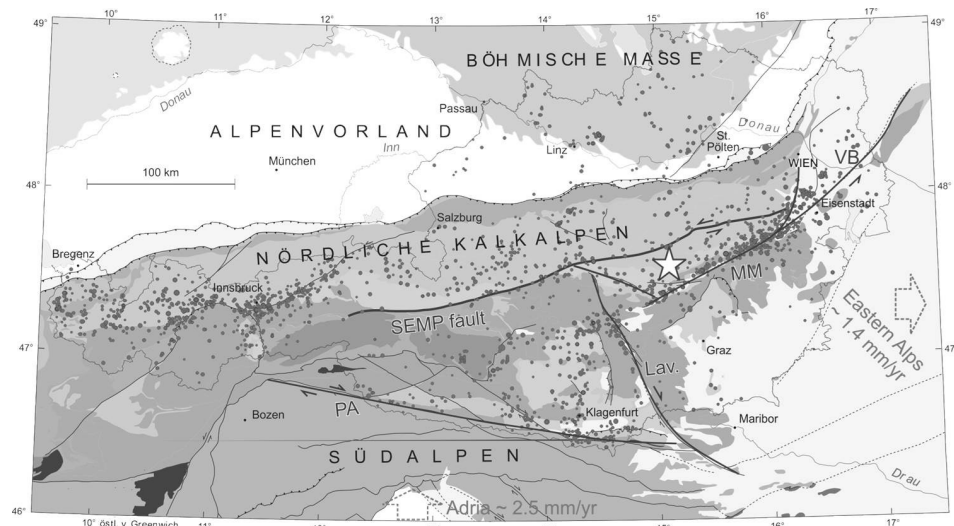


Fig. 1. Geological map of Eastern Alps. SEMP—Salzachtal-Ennstal-Mariazell-Puchberg-fault, PA—Periadriatic fault, MM—Mur-Mürz fault, Lav. – Lavanttal fault, VB—Vienna Basin (modified after Schuster, 2013). Open circles indicate epicenters of earthquake events since 1900 (Reinecker & Lenhart, 1999). Diameter of symbols is proportional to magnitude. Arrows in blue represent the direction and speed of moving of tectonic entities (GPS data after Bus et al., 2009). Hirschgruben cave is indicated by white star

HIRSCHGRUBEN CAVE AND SCRATCHED FLOWSTONE

The main strand of the SEMP cuts through the northern Hochschwab karst massif, which is part of the Northern Calcareous Alps. Hirschgruben cave

is located within this fault zone, 6.7 km south of the faultcore of the SEMP fault, and at 1890 m above sea level (a.s.l.). The cave has a surveyed length of 4.5 km and consists mainly of galleries of phreatic (Tertiary) origin, which were later modified under vadose conditions. The cave formed within cataclastically deformed Upper Triassic dolomitic limestone and Middle Triassic dolostone.

A WSW-ENE-trending, fault-controlled gallery 190 m below the surface shows indications of neotectonic sinistral displacement, mostly broken speleothems and breakdown debris. However, according to Plan et al (2010), horizontally scratched flowstone was also formed during movements of the fault. The breakdown of blocks that were pinched between the two cave walls (which are part of both fault blocks) most likely scratched the flowstone during fault movement. Some blocks are still visibly pinched and heavily crushed (Fig. 2). Within 12 m of the gallery around twenty subparallel scratches were identified, some as long as 23 cm (Fig. 2). The scratches are present on both the footwall and hanging wall, parallel to fault and commonly are overgrown by a few millimeter-thick, younger (post-faulting, undeformed) generation of flowstone. This young calcite layer also covered breakdown debris of various sizes.

Plan et al. (2010) also reported dislocated stalagmites and flowstone that were sheared off or ruptured by the sinistral movement of the cave walls. Based on these features, an offset of 20–30 cm was reconstructed. The ceiling often shows the sharp fault contact, occasionally with few small pockets that show sinistral offset of about 25 cm. The faulting also displaced a part of a massive flowstone (Fig. 2). Lower generation of this massive flowstone was formed prior to the fault activity and was displaced, whereas the younger generation lacks deformation features.

Drill cores were obtained from scratched flowstone in the hourglass gallery (cores H1–H3) and the faulted flowstone (cores H4 and H5) for U/Th dating. The pre-deformational calcite of the flowstone covering the oblique wall yielded ages of 140.8 ± 9.5 (core H1) and 132.9 ± 5.2 ka (core H3). These ages are slightly older than those obtained from the lower generation the faulted flowstone that range from 118.0 ± 2.6 to 126.2 ± 4.2 ka. The younger generation of calcite flowstone, which grew across this fault, yielded ages of 9.1 ± 0.5 (core H4) and 8.3 ± 0.3 ka (core H5). To conclude, the U/Th ages obtained from flowstone indicate the fault was active at least between 118 – 9 ka. Damaged speleothems are now proven to provide an opportunity to constrain the chronology of tectonic events as old as ca. 500 ka, which is the dating limit of the U/Th method (Plan et al., 2010).

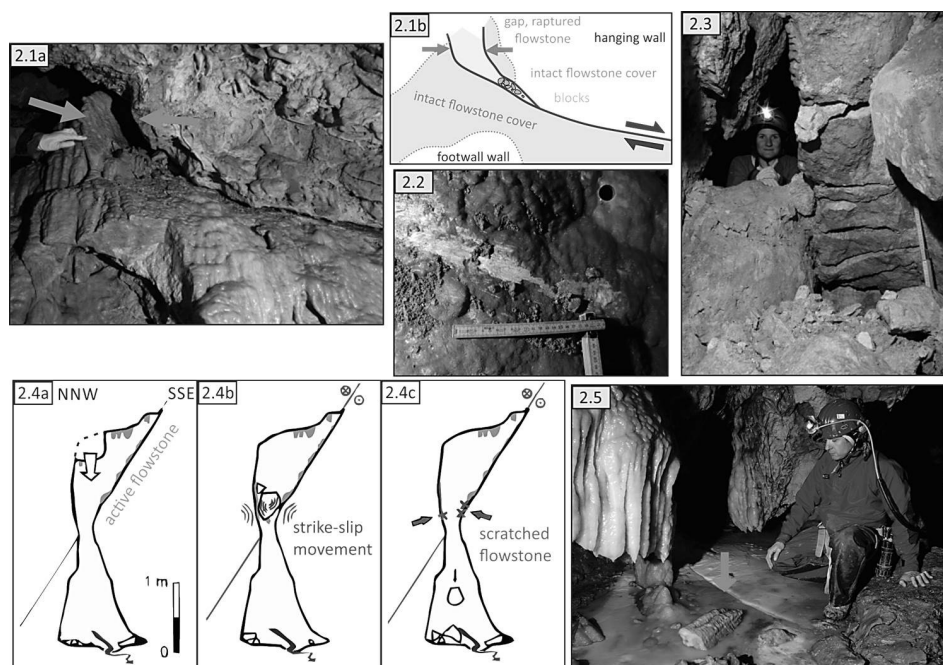


Fig. 2. Structural indicators of neotectonic activity in karst caves: 2.1a. Photo of a massive flowstone that grew in a ceiling niche between footwall and hanging wall and was ruptured by sinistral strike-slip faulting. The main part of the flowstone remained attached to the footwall and left a gap (20 to 30 cm) to some smaller parts being attached to the hanging wall. The tips of blue arrows mark points that were adjacent to each other prior to the offset. Note that the shear sense appears reversed due to the upward view. 2.1b. Line drawing of (2.1a); 2.2. Photo of a flowstone showing scratch marks partly overgrown by thin, transparent calcite layer (centimeter scale). Scratch marks are only developed on fault-parallel surfaces and on left sides of flowstone hummocks, indicating sinistral shear. Note the sampling borehole of core H3 in upper right corner; 2.3. Photo of a blockpinched between two moving cave walls and broken into six parallel pieces; 2.4: Line drawing of proposed mechanisms for origin of scratched flowstone: a—deposition of flowstone on walls of gallery showing hourglass-like cross section that developed along active fault; b—breakdown block gets pinched in neck of gallery. Differential movement of passage walls during fault displacement causes block to scratch surface of flowstone. c—Block breaks up as fault movement continues and its fragments fall down, exposing scratches (see 2.3); 2.5. Photo of a fault in massive flowstone partly sealed by post-event flowstone. Arrow indicates location of drill hole (core H5). Modified after Plan et al. (2010)

MICROSTRUCTURE OF MICRO-DISPLACEMENTS

Following work of Plan et al. (2010), further geological and speleological investigations were conducted and resulted in more records of neotectonic activities in caves. As mentioned, speleothems and the morphology of Hirschgruben cave show evidence of about 25 cm displacement associated with slip along an east-northeast-striking sinistral strike-slip fault that is part of the SEMP fault zone. On the outcrop-scale, it is hard to discriminate between seismic slip, caused by an earthquake, and aseismic creep, a slow movement along the fault, but microstructural analyses can improve our understanding of fault mechanics.

The calcite in flowstone is characterized by uniformity of growth in which calcite long axis is perpendicular to the cave wall. This gives us a unique opportunity to analyze natural deformation features under very specific conditions, in this case: uniform orientation of crystals, origin of deformation (strike-slip fault movement), time constraint between 118 ka and ca. 9 ka, depths of 190 m below the surface (1890 m above sea level) and constant low temperatures (0–5 degrees Celsius), with no confining pressure except the stress caused by pinching blocks and footwall and hanging wall. Additionally, after the deformation, a thin layer of younger flowstone coated the scratch, preserving the original slip surface.

In order to understand and discriminate between seismic and a seismic slip along faults in carbonates, microstructural characteristics have been investigated in detail, mostly on limestone and marble. Velocity weakening processes, for example fracturing-abrasion-wear associated with displacement and rotation of the mineral grains, and velocity hardening processes, like dissolution-precipitation creep, are usually examined in both non-foliated or foliated fault rocks (Niemeijer & Spiers, 2006). Experimental high-velocity shear tests have suggested other potential seismic slip indicators in fault rocks, such as thermal decarbonation products (Han et al., 2007), clay-clast aggregates (Boutareaud et al., 2008), grain size segregation structures (Ujiie & Tsutsumi, 2010) or a thin zone of plastic deformation (Kim et al., 2010). However, both limestone and marble lack the purity of controlled environment that flowstone calcite has.

According to Mitrovic et al. (2015), thin section-scale microstructures of deformed flowstone show typical brittle fracture characteristics, such as cataclasis, Riedle shears, grain size reduction and deformation twinning. However, some crystal-plastic deformation features are also present which suggests complexity of the fault. To further investigate these structures, we implemented series of high-resolution electron beam

analytical techniques including scanning electron microscope (SEM), electron backscattered diffraction (EBSD) and cathodoluminescence (CL).

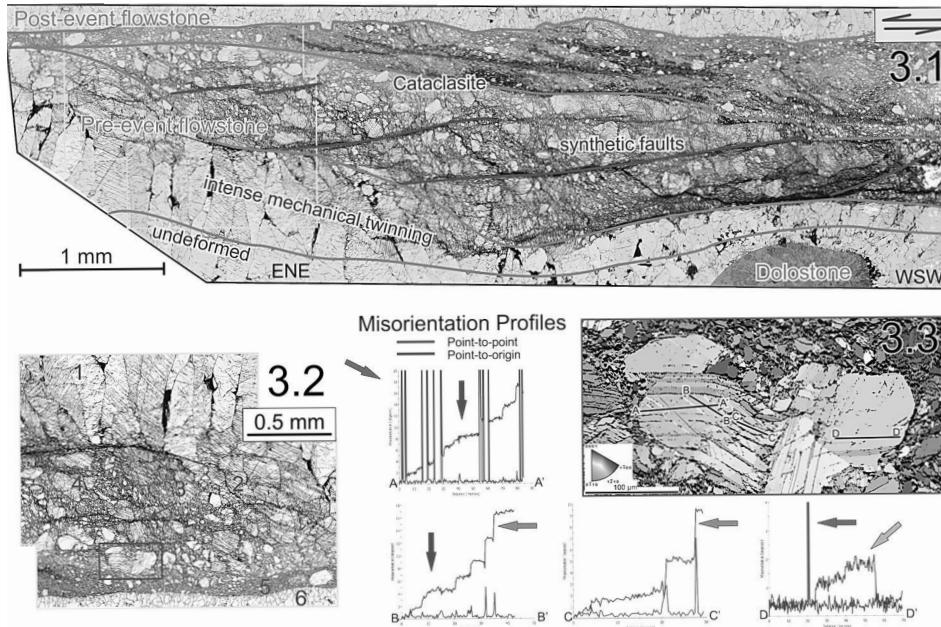


Fig. 3. Microstructural characteristics of naturally deformed calcite flowstone: 3.1. Electron-backscattered image mosaic showing typical features observed in sheared speleothems, such as transition from undeformed calcite crystals to highly deformed foliated cataclasite, marked by the increase in twinning density and grain size reduction; Note: undeformed post-event flowstone in the top of the image; yellow box shows location of inset presented in 3.2–3.3.; 3.2. Electron-backscattered image of a detail of microstructures (upside-down): (1) difference in deformation twinning intensity within large crystals, (2) highly fractured transition area, (3) open cracks along Riedle shears, (4) two types of deformation twinning within a same grain, (5) very fine-grained layer marking fault slip surface, (6) undeformed post-faulting speleothem layer; red box shows location of inset presented in 3.3.; 3.3. Electron-backscattered diffraction orientation map of calcite c-axis: misorientation profiles in the map match with the plots. The image shows deformed grain with developed deformation twins and kinks; misorientation profiles show the variations in crystal lattice within the grain: green arrows mark deformation twins spikes, orange arrows mark steps with plateaus characteristic for brittle deformation, magenta arrow mark continuous change in axis orientation that might be caused by plastic deformation, pink arrow mark probable microcracks. Note difference in vertical scale of each plot. Modified after Mitrovic et al. (2015)

Additionally to the structures described above, SEM imaging showed the presence of different types of fracturing, the grain size reduction is more drastic (several orders of magnitude) and the internal growth features of the crystals do not seem to have an effect on the deformation.

EBSD maps have revealed existence of subgrains and gradual torsion of crystal lattice, both features typical of ductile deformation regime. However, since calcite crystals in speleothems are pure, mostly with calcium and magnesium as the only cations, there is a lack of luminescence activators, therefore CL images are not very instructive (Mitrovic et al., 2015).

These components of naturally sheared flowstone from Hirschgruben cave pose evidence for changing fault behavior, including both seismic slip and a seismic creep. Further investigations are necessary to better understand behavior of the fault that caused deformation of the flowstone.

MONITORING IN SITU MICRO-DISPLACEMENTS

Observing and in situ measuring of activity along the major fault systems of the Eastern Alps is one of the major tasks of the Speleotect project. For monitoring purposes, a special high-accuracy 3D crack gauge, the TM71, commercially produced by Gestra, is used. The gauge is permanently installed across cracks and joints belonging to the fracture network of major fault systems, such as the Salzach-Ennstal-Mariazell-Puchberg (SEMP), Mur-Mürz, Periadriatic, Lavanttal, and Vienna Basin marginal fault. There are seven crack gauges TM71 with automated reading devices installed in five caves with faults that are younger than the hosting cave and related to the mentioned faults (Baron et al., 2015).

The instrument measures displacements of two blocks in 3D including rotations, based on the principle of mechanical interference between two optical grids. Three-dimensional monitoring is important as displacements in cracks and between joint faces are frequently slip-like (Košťák, 1991; 2006). The sensitivity of the TM71 gauge system is $50 - 12.5 \mu\text{m}$ in all three space coordinates of displacement, and 3.2×10^{-4} rad in angular deviations of the two fault / joint planes. The accuracy of at least $30 \mu\text{m}$ is confirmed after its performance in harsh environmental conditions. Nonetheless, the TM71 gauge system is a very sturdy instrument that can be used even at remote locations like caves (Košťák, 2006).

Kinematics of recorded micro-displacements has been compared to known regional fault kinematics and related to regional seismic activity. Within the first year of observation, several micro displacement events were registered, sometimes revealing the same mechanisms as the geologically documented kinematics of the particular active faults, but in other cases indicating completely opposite kinematics. According to Baron et al. (2015) these micro-displacements seem to occur in seismically quiet

periods, usually as a precursor to local seismic events of different magnitude (varying between ML 0.1 and 3.3). However, gravitational mass movements are also recorded that accompanied the tectonic moments.

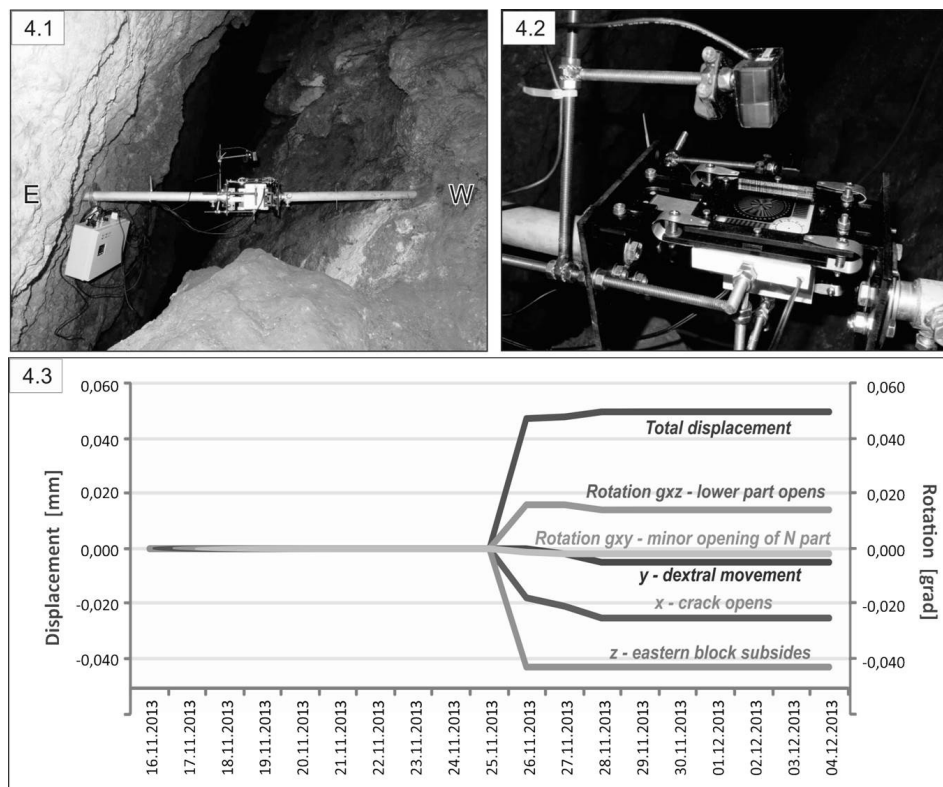


Fig. 4. Active micro-displacement measurements conducted using the crack gauge TM71: 4.1. Photo of in situ instrument setting; 4.2. Photo of a close-up view of the instrument showing the optical grids and cameras; 4.3. Graphical representation of displacements in 3D along an active fault: for the fault activation magnitude of 0.05 mm, the eastern block subsided about 0.043 mm and rotated about 0.015 grad along the vertical plane, the crack opened about 0.025 mm. Note: x , y , z – principal axes, gxy – rotations on the horizontal plane, gxz – rotations on the vertical plane (after Mitrovic et al. 2014)

PROSPECTS OF SPELEOTECT

Our innovative project, as a comprehensive study of neotectonic and paleoseismic features in caves, microtectonics of faulted flowstones and monitoring of tectonic micro-displacements of the Eastern Alps, contributes to the mosaic of the knowledge of past earthquakes in this area, and brings

new discrete geological proofs of the lateral extrusion of the Eastern Alps. The innovation of our approach resides in the combination of different up-to-date methods for a complex and comprehensive characterization of recent tectonic processes in the karst areas in general, and the result will substantially contribute to the paleoseismologic database in the studied area, a task necessary for an adequate earthquake hazard assessment.

ACKNOWLEDGEMENTS: This Project is funded by FWF: P25884-N29. We thank everyone who have helped with their advice.

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GRAVEL DEPOSITS IN THE VALLEYS OF MT. MALJEN, IN THE CONTEXT OF CVIJIĆ'S CLIMATOGENIC CONCEPT

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ABSTRACT: The paper presents the results of field research on fluvial gravel deposits in the river valleys of Mt. Maljen, a serpentinite mountain morphostructure in western Serbia. Preliminary results have shown that the valleys of Mt. Maljen are filled with fluvial and proluvial sediments deposited in multiple phases. Field mapping was done in the river catchments of the Kamenica, Bukovska Reka and Ribnica. By application of qualitative geomorphological analysis, the correlation of terraces was carried out, and the notes on the character of the deposits given. The factors of deposition are connected to the energy balance of the basins, as well as to the climatic influences. The paper also highlights a similarity between recent and old fluvial deposits, which is explained according to the principle of actualism and the intensity of the impact. The impact of climate on fluvial polyphasing is discussed in the context of Cvijić's initial idea and subsequent problems in the development of fluvial and climatic geomorphology.

Key words: fluvial gravel deposits, impact of climate, Cvijić, Maljen, western Serbia

INTRODUCTION

One of the approaches in fluvial geomorphology is the division of patterns and river types based on accumulative phenomena and processes. It is generally accepted that the patterns can be divided into straight, braided, anastomosing and meandering (Miall, 1977; Vandenberghe & Woo, 2002, et al.). In part, this approach was also presented by Jovan Cvijić (1926/1996) when he observed a "wild river", which corresponds to the pattern of braided river. However, this approach has not been further developed in Serbian geomorphology.

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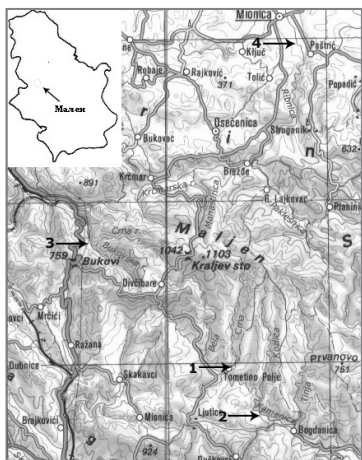


Fig. 1. The overview map with the positions of significant profiles of river terraces (1, 2, 3, 4) and the position of Maljen in Serbia

The impact of climate on the processes and dynamics of fluvial deposition and erosion is dealt with in a number of papers (Vandenberghe, 2003). A. Penck (1910) is often mentioned as the initiator of the climatic approach in geomorphology, while the development of the climatic geomorphology concept is attributed to J. Büdel (1977) (Vandenberghe, 2003). It had not been previously known that, even before these relevant researchers, J. Cvijić genetically linked "observations of sediments and various forms on the Balkans with glacial climate and its fluctuations" (Cvijić, 1903/1991).

Some occurrences of fluvial gravel deposits have been observed on Maljen, a low mountain in western Serbia. Based on the locations of these deposits in several valleys, we estimated that the factors of their occurrence (the energy balance of the basin and the impact of climate) could be analyzed. In that sense, the aim of this paper is to correlate observations from the valleys of Maljen with knowledge about this issue, especially in the context of Cvijić's climatogenic approach.

STUDY AREA

Maljen is a low mountain in western Serbia (the highest peak is Kraljev sto, at the elevation of 1103 m) within Podrinje-Valjevo mountain range in the north of the Internal Dinarides. Mountain morphostructure of Maljen corresponds to a serpentinite massif, stretching from Kolubara Neogene basin in the north to a smaller structural basin Tometino Polje in the south. In the east it ends with Suvobor, while in the west there are mountains Maglješ and Povlen over the Bukovi pass.

The development of complex topography in the north has been facilitated by the geological structure dominated by serpentinites and limestones. There is a series of old levelled surfaces that have been reduced by fluvial erosion. The fragments of the old fluvial levels are preserved in the relief as flat areas along watersheds or in the form of a landscape unit Divčibare (980–1000 m). From Divčibare, water courses of Bukovska Reka and Crna Reka drain to the basin of Suvaja; Crna- and Bela Kamenica to the basin of Kamenica, while Krčmarska Reka, Manastirica and Paklešnica drain to the basin of Ribnica in the north of Maljen. These watercourses incise through gorges on the mountain slopes and wide valleys with alluvial plains in the lower parts of the basins. The valleys are incised into serpentinites, except for the basin of Ribnica in the north, which is incised into limestone. The metamorphism of harzburgites influenced the creation of a large mass of serpentinite on Maljen. The process of serpentinitization is characterized by the increase in volume and the cracking of rocks. This

is also the case when it comes to surface alteration, which is of importance for hillslope processes and fluvial erosion. Landscape of Maljen is also exposed to neotectonic activity, which is described in detail in geomorphological analysis (Zeremski, 1983).

In modern conditions, the area of Maljen is in the continental climate zone, as a part of a special climatic sub-area of Valjevo Mountains. Average air temperature in Divčibare is 7°C (960 m a.s.l.) and there is a significantly higher precipitation compared to the surrounding area, averaging at 1131.6 mm (Ducić & Radovanović, 2005). It is believed that the territory of Serbia was in the zone of “cold forest steppe” during the Pleistocene glaciations (Zeremski, 1977). In terms of Quaternary climate change, especially during the last glaciation, postglaciation and Holocene, there were several changes of the vegetation cover. The last such change took place during the Holocene under the influence of human activities due to the creation of pastures. At that time, on Maljen, large forest areas were destroyed, especially on the southern serpentinite slope.

METHODOLOGY

Occurrences of gravel deposits and river terraces in the valleys of Maljen were surveyed during the field research from 2012 to 2015. The procedures used were qualitative geomorphological analysis, the recording of lithostratigraphic terrace columns, the general analysis of fluvial sediments (sediment type and facies analysis). Qualitative geomorphological analysis was performed in the field by using the process of locating, mapping (standard GPS device) and morphometry (length, width, slope, relative altitude, etc.). The analysis of location was performed according to the general characteristics of landforms and geological features of the surface in which the valleys are cut, as well as the qualitative analysis of gravel in the field.

In general, river terraces and fluvial sediments are usually analyzed within a basin and a valley with observations on appropriate correlating levels. This research on Maljen used the regional approach which emphasizes the influence of factors in the development of respective morphologies.

THE RESULTS OF FIELD RESEARCH

More detailed field research was conducted in the basin of Kamenica – on the main river, as well as on its affluent Crna Kamenica and right tributary

Tinja, on Bukovska river downstream from the river mouth of Crna Reka, where it flows into the basin of Suvaja, and in the basin of Ribnica, on the main river and its affluents Krčmarska Reka, Manastirica and Paklešnica. The conducted field research is at the level of preliminary results and it needs to be supplemented by further detailed research.

In the basin of Kamenica, on the main watercourse of the Crna Kamenica and the Tinja, two gravelly river terraces were found, as well as alluvial and inundation levels in certain parts. Gravel is composed of large boulders and debris, deposited in the extensions of the valleys with a slight decline. In the gorge of Crna Kamenica, upstream of Tometino Polje, there are no gravel deposits. They have been sporadically preserved in the form of conglomerates, in the extensions of the valley, or at the river mouths of side tributaries in the form of alluvial fans.

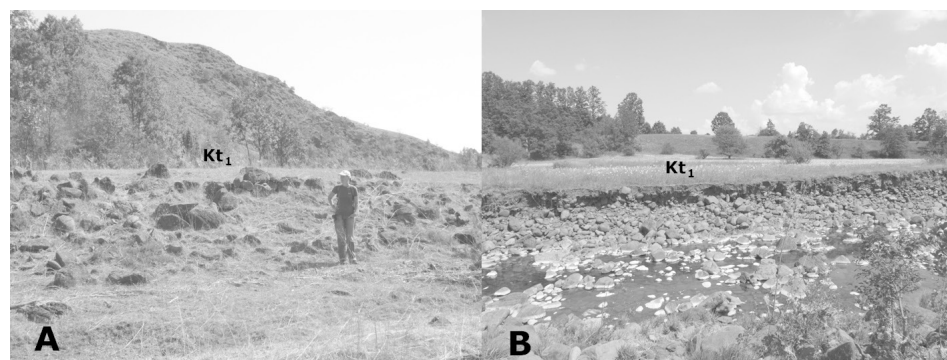


Fig. 2. Profiles of the first terrace of Kamenica (Kt_1) in the gorge with large debris (A), downstream, and the first terrace of Crna Kamenica (Kt_1) on Profile 1 with boulders (B), upstream

The first terrace of Kamenica and Crna Kamenica (Kt_1) is completely formed of accumulation material, with serpentinite debris and boulders, debris deposits downstream and boulders upstream (Fig. 2). The terrace can be observed at the exit of Crna Kamenica into Tometino Polje near the hamlet Jankovići (profile 1) (Fig. 3) and downstream beyond the gorge of Kamenica (profile 2). In this direction, its height increases by 1.6–2.3–4.5 m of relative height. In the profile (1) at Jankovići, on the terrace, we can see an old distributary of a braided stream from accumulation phase and there are smaller reefs at one place in the gorge. Debris and gravel on the terrace are clearly visible, with sparse soil and grass, which suggests that the terrace is not flooded even by the biggest waters because there are no alevrite deposits of floodplain facies.

The second terrace of Kamenica (Kt_2) was observed only in certain parts, like in the profile (1) at the hamlet Jankovići (Fig. 3), where it can be found in the form of a large alluvial plain and downstream of the Kamenica gorge in profile 2. This is an older gravelly terrace consisting of large serpentinite boulders, covered in soil and grass, with crops and pastures. Its height increases in the downstream direction from 6 to 8,5 m of relative height.

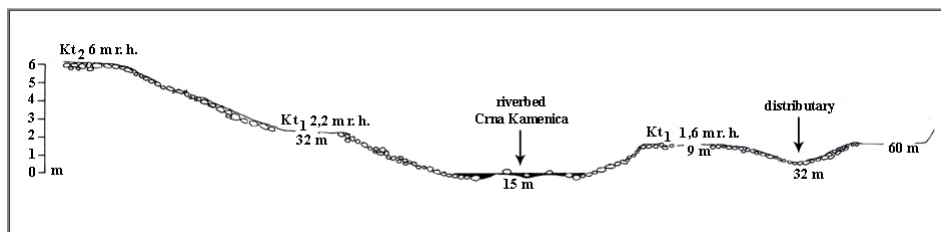


Fig. 3. Profile (1) of the river terraces of Crna Kamenica (Kt_1 and Kt_2) in front of Tometino Polje near the hamlet Jankovići

In the valley of the Tinja, the right tributary of the Kamenica, in the lower stream before the river mouth into Kamenica, two gravelly terraces of 2–3 m (Tt_1) and 3–4 m (Tt_2) were noted. They are difficult to distinguish without detailed measurements due to the small height difference. There is a distributary of a former braided stream on the first terrace. It can also be observed on alluvial plain in some parts of the braided stream (Fig. 4). At the river mouth of the Tinja, where it flows into the Kamenica, a recent alluvial fan is deposited, but there are also older proluvial deposits.

Crna Kamenica and Kamenica, to the end of the gorge downstream of Tometino Polje, do not have a prominent alluvial level, except for one place in the gorge with inundation phenomena (areas with large boulders), resembling the deposition processes of a braided river. There is an alluvial level 2–3 m high in the wide valley downstream of Kamenica gorge and profile 2, with alevrite at the roof of the floodplain facies. Alluvial level occurs in the gorges of tributaries Kozlica and Tinja, high in the mountain area of Bogdanica (Zeremski, 1983). The height of this level is 1–0,5 m, sporadically with the characteristics of braided stream and occurrences of reefs along the alluvial plain (Fig. 4). Riverbed of the watercourses in the basin of Kamenica is incised into the bedrock with large boulders, except in one part of the main river, downstream of the gorge, where there are gravel deposits in the form of lateral and longitudinal reefs.

On the Bukovska Reka river, there is a profile immediately downstream of the river mouth of the Crna Reka (profile 3) (Fig. 5). There are three gravel terraces in this part, which is the largest number of river terraces for a single profile on Maljen. In addition to the alluvial level at 1.2 m of

relative height (al), there is a gravel terrace at 3.7 m (Bt_1) on the right side of the river. On the left side of the river, there is a series of two gravel terraces at 7.7 m (Bt_2) and 9.2 m (Bt_3) (Fig. 5). The gravel of these terraces in the form of serpentinite boulders can also be found downstream on the same side of the valley, along with two series of boulders at a greater relative height. The plane of the third terrace (Bt_3) has been changed by proluvial, colluvial and diluvial processes in the valley. The boulders of the third terrace (Bt_3) can be seen on the left side of the Crna Reka, just in front of the river mouth, in the form of a 3–3.5 m thick horizon which lies across the serpentinite bed at 9.6 m of relative height.



Fig. 4. The first terrace of Tinja (Tt_1) and the braiding of the alluvial level with reef and distributary (al)

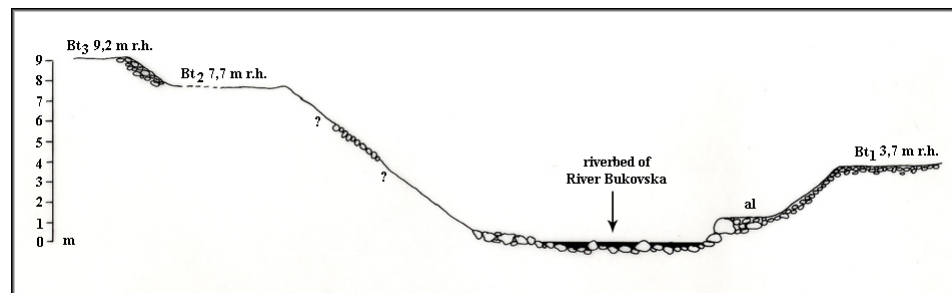


Fig. 5. Profile (3) of the river terrace of the Bukovska Reka (Bt_1 , Bt_2 , Bt_3) near the river mouth of the Crna Reka

The profile of the river terraces of the Bukovska Reka near the mouth of the Crna Reka is a representative example of gravel deposits at the end of mountain gorges. Upstream of the Crna Reka gorge, there were no signs of fluvial deposition and dominant incision of riverbed into the bedrock. Certain gravel deposits and debris were registered only in the source area of the headwater streams, where there is a slight decline in the longitudinal profile.

The basin of Ribnica is completely cut into the limestone, except for the parts of Paklešnica and Krčmarska river with occurrences of shorter river terraces which cannot be traced along major watercourses. In the basin of Ribnica there are significantly less gravel deposits.

At the exit of the mountain gorges, at the beginning of the Krčmarska Reka and the Manastirica (at the spring), there are colluvial-proluvial fans made of limestone blocks. Shorter river terraces can be found downstream on these rivers. At the spring of the Manastirica there seems to be a gravel terrace 5–7 m high. Near the Krčmarska Reka (in the village of Krčmar) there is a terrace with rapidly increasing height, from 2.5 to 6.7 m, because of a great decline. Riverbeds of these rivers are incised into the bedrock.

An accumulative alluvial level 2–2.5 m high is clearly visible in the valley of Paklešnica, but generally there are no river terraces. Before the confluence with Manastirica, Paklešnica has characteristics of anastomosing river type (Fig. 6). On the left side, along the main river, a terrace with a relative height of 6–10 m can be observed, but its sedimentological characteristics were not determined. There are more gravel deposits that form a terrace with the relative height of 4–5 m near the mouth of the Pior creek with the river basin on serpentinites. In the area of the Planinica village, in the source sector of Paklešnica, there is no gravel, and river beds are cut into the bedrock. The general impression is that the left tributaries of the Paklešnica deposited gravel at the river mouths, partially in the form of terraces or alluvial fans, but there are no river terraces downstream.

Downstream of the confluence of Manastirica and Paklešnica at Brežde, Ribnica is incising in limestones. For our analysis, recent fluvial gravel deposits in the form of lateral (side) and longitudinal (central) reefs in the riverbed are particularly important. Deposition of gravel is related to the morphology of the canyon where there are side reefs at the river bends and central reefs toward the exit of the canyon. Central migrating reefs in the riverbed were observed during the research, especially after the great floods in May 2014. The deposits of these reefs are composed mainly of fine gravel.



Fig. 6. *Anastomosing river type, Paklešnica, ahead of the confluence with Manastirica*

Near Mionica, downstream of the canyon of Ribnica in Kolubara basin, and underlain by the Neogene sediments, there is a series of terraces typical for lowland conditions of fluvial polyphasing (Fig. 7). Above the riverbed of Ribnica which is cut into Neogene clay, there is an erosion-accumulative terrace (Rt_2) with the relative height of 6 m, the roof of which has the alverite horizon of floodplain facies and the soil of the transformed part of the terrace. The base of these layers is made of gravel horizon 2 m thick, and there is Neogene clay at its core (Profile 4). There is also a lower terrace (Rt_1) of similar stratification, at the relative height of 2 m, but the soil-alverite horizon is 0.8 m thick, and the coarse gravel horizon is 0.7 m. On Neogene clay at the right side of the river there is an alluvium conglomerate gravel horizon with the thickness of 1 m.



Fig. 7. Profile (4) of the river terrace (Rt_2) and the alluvial level of (al) Ribnica. Explanation: 1-the roof of the terrace made of alverite and soil, 2-gravel horizon, 3-Neogene sediments, 4-riverbed, 5-alluvial level

In the zone of profile 4, in the lowland part of the Ribnica basin, we can discern a series of three gravel deposits (Rt_2 , Rt_1 and al), with the conspicuous presence of alverite, characteristic for the conditions of floodplain facies of fluvial sedimentation in the plains at small declines.

THE ANALYSIS OF RESULTS

In general, based on the results of qualitative field research, factors that have contributed to the emergence of the present fluvial relief can be separated into following groups: the energy balance of basins (lithology, inclination, relief, neotectonics), the impact of climate and human impact. Serpentinite morphostructure of Maljen, with its deposited gravel, proved to be suitable for the analysis of the influence of different factors on its creation due to its landscape diversity.

All factors are important within the energy balance of the basin. In the context of lithology, we can clearly notice the frequent deposition of gravel and debris in the serpentinite basins due to intensive decomposition of this rock. Serpentinite basins of the Kamenica and the Bukovska Reka showed significant representation of accumulative terraces, while these forms are mainly absent in limestones of Ribnica. The influence of lithology can be seen on the example of Paklešnica basin due to greater amounts of gravel deposits compared to tributaries from serpentinite areas.

The consequences of inclinations of the longitudinal profiles are clearly noticeable. The absence of accumulation can be seen on sections with larger inclinations along the gorges. Gravel is mainly deposited in the areas with smaller inclinations in wider parts of the valleys. Some differences, like the absence of alluvium deposits in one part along the Crna Kamenica and Kamenica, or the occurrence of these deposits in tributaries Kozlica and Tinja, could be explained by differential neotectonics. In this case, this means the uplift at the fault of main watercourses (Zeremski, 1983) and a less dynamic uplift within the block of Bogdanica on tributaries. The incision of riverbed into the bedrock should be an indication of the tectonic uplift.

Deposited coarse gravel and debris in the valleys on Maljen, especially within river terraces, is an important indicator of climatic impact at the time when these sediments were transported and deposited. Grain size of gravel and their distribution (levels and terraces on the sides of the valley) point to the multiphase extreme events. The characteristics of deposits primarily on low terraces of Kamenica (Kt_1), Tinja (Tt_1), Bukovska Reka (Bt_1) and Ribnica (Rt_1) indicate the extreme conditions of flow changes, even proluvial characteristics.

The braiding of rivers with large gravel deposits and reefs (braided rivers) is taken as the climate conditioned phenomena (Vandenberghe, 2003). Problems arise when these occurrences are registered in recent, subrecent and old parts of the valley. According to our recent research,

the formation of reefs is present in Ribnica and Kamenica in the downstream sections, subrecent braiding is present at the alluvial level of the river Tinja (Fig. 4), and previous braiding has been recorded on the first terrace of Kamenica (Kt_1) (Fig. 3) and Tinja (Tt_1). Qualitative observation revealed that the deposit grains from the terraces are of larger diameter than the grains of recent bedload. This is an indicator of climatic influence through changes or extreme events according to the principle of actualism. In other words, the climatic effects differ through time, following the climate changes and the intensity of their impact.

The influence of vegetation as an indirect climatic factor, but also anthropogenic factor in modern times (deforestation), can be seen through colluvial phenomena, selective denudation and excessively extreme erosion. Anthropogenic influence is also observed downstream of the gorge of Kamenica where the destruction of floodplain forests along the inundation level facilitated the water flow, so the occupied and processed alluvial level is not heavily flooded.

Jovan Cvijić (1903/1991), under the influence of Pleistocene glaciations traces, analogously determined the climatic impact on fluvial processes in and out of the glaciated areas. Field results from the Maljen valleys seem to fully confirm his point of view because it would be difficult to explain the gravel deposits in the Maljen valleys without the influence of climatic factors.

Extensive modern studies, along with gathered information about fluvial processes, have shown that these are highly complex natural phenomena. In literature that was used (Vandenberghe, 2003) a large number of issues regarding "climate directing the dynamics of river systems" is presented. Despite a great number of disputes, starting from the fact that there is a large number of climatic factors (direct, indirect, partial) (Vandenberghe, 2003), the impact of climate on river systems is undeniable. There is only a question of quantification and explanation of all the cases of this influence. One of the problems in this area that has also been noted by our observations is the similarity between old and recent phenomena and processes, which we explained using the principle of actualism and the intensity of the impact.

CONCLUSION

From the initial ideas (Cvijić, 1903/1991, Penck, 1910, etc.), through the second half of the 20th century, but also in the beginning of the 21st century, there is a continuing discussion about the impact of climate on fluvial

process or “climate directing the dynamics of river systems” (Vandenberghe, 2003). After exhaustive analysis, the conclusion is that “there is no single explanation, but a great variety of climatic factors that influence the development of river” (Vandenberghe, 2003). This essentially means that many phenomena in river systems cannot be explained without climatic factors, and in some cases the impact of climate is indisputable, as for example in the case of fluvio-glacial terraces. In the context of Cvijić’s understanding of the impact of climate on the development of rivers (1903/1991), it can be said that it was an initial and largely intuitive view. The development of geomorphology brought about more detailed and complex research which takes into account the complexity of the functioning of river systems through geological history marked by climate change.

On the example of fluvial deposition in the area of Mt. Maljen, we observed the most relevant factors of fluvial development in an area outside the zone of significant climate impacts (e.g, outside of the glacial and possibly periglacial areas). Based on these initial results, it is necessary to explore the fluvial polyphase on Maljen in more detail.

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A CONTRIBUTION TO JOVAN CVIJIĆ'S CONSIDERATION OF THE VIŠOČICA RIVER SOURCE

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ABSTRACT: The Višočica River catchment is largely situated in eastern Serbia. The conventional view is that this river rises in Bulgaria, on the southern slopes of the Balkan Mountains, and enters Serbia near Donji Krivodol. In 1896, Jovan Cvijić claimed that the source of the Višočica was actually in the drainage area of the Dojkinačka River that is, conservatively speaking, a right-bank tributary of the Višočica. Cvijić based this claim on observed discharges. The present research sought to verify Cvijić's claim, through an analysis of meteorological, hydrological, geological, and hydrogeological data. The main results of the study are: 1. The long-term average discharge of the Višočica (catchment 227.0 km²) and the Dojkinačka (catchment 137.5 km²) is 1.65 m³•s⁻¹ and 3.76 m³•s⁻¹, respectively; 2. The lowest discharges of the Dojkinačka are much higher than those of the Višočica, which often dries out. The results suggest that the sizes of the topographic catchments of the two rivers were not valid from a hydrogeological perspective. The geologic framework of the terrain led to the conclusion that Middle Triassic limestones play a significant role in the spatial re-distribution of water. These limestones make up a part of the left side of the Višočica Valley and host a karst aquifer where groundwater flows from the Višočica catchment to that of the Dojkinačka. The karst aquifer's storage and retardation capacities also determine the temporal flow distribution of the Dojkinačka. The results corroborate Cvijić's claim that the source of the Višočica is within the catchment of the Dojkinačka.

Key words: river source, the Višočica River, Jovan Cvijić, catchment area, the Dojkinačka

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INTRODUCTION

The catchment area of the Visočica River (hereafter: the Visočica) extends in part into the territory of western Bulgaria but is largely situated in southeastern Serbia. The Visočica is a right-bank tributary of the Temštica River and belongs to the Nišava River Basin. Consequently, it is part of the South Morava (Serb. Južna Morava) River Basin and, ultimately, it belongs to the drainage system of the Black Sea.

The conventional viewpoint is that the source of the Visočica is situated in Bulgaria, on the southern slopes of the Balkan Mountains (Stara Planina), in the area of the Berovo range. However, Jovan Cvijić (1896) claimed that its source was actually in the catchment area of the Dojkinačka which, according to conventional interpretation, is a right-bank tributary of the Visočica. This Cvijić's claim was based on the fact that in dry periods the Dojkinačka contributed to the persistence of the Visočica downstream from their confluence. Namely, the large capacity of a spring called Jelovičko Vrelo led Cvijić to identify it as the true source of the Visočica, stating that the volume of water delivered by the Visočica from Bulgaria was apparently much smaller.

In general, the prevailing view in technical literature is that the source of the Visočica is situated in Bulgaria. Only a few authors have previously considered Cvijić's findings (Čubrilović, 1995; Petrović, 1999; Petrović, Stanković & Popović, 2000; Nikić, 2003). The objective of the present study of relevant meteorological, hydrological, geological, hydrogeological and geomorphological data was to verify Cvijić's claim.

MAIN CHARACTERISTICS OF THE STUDY AREA

The studied part of the catchment area of the Visočica, which includes also the drainage area of the Dojkinačka, is situated upstream from the Village of Visočka Ržana. It is bordered by Stara Planina (summits: Kom, 2,016 m; Srebrna Glava, 1,932 m; Mučibaba, 1,727 m; Kopren, 1,963 m; Tri Čuke, 1,933 m; Vražja Glava, 1,934 m) in the northeast. There is a water divide in the west, which connects Stara Planina summits from Vražja Glava in the north, via Bratkova Strana (1,943 m), Mramor (1,759 m), Pakleški Vrh (1,301 m), Strašne Čuke (1,159 m), and a gauging station on the Visočica near a bridge in the Village of Visočka Ržana (685 m), with the Mt. Vidlič summit of Guvnište (1,413 m) in the south. The divide runs in the southwestern direction along the Vidlič mountain range (summits within the territory of Serbia: Obešnik, 1,195 m; Izatovska Čuka, 1,255 m; Golemi

Kamik, 1,273 m; and Vidlič 1,115 m; and in Bulgaria: Gradishte, 1,088 m; and Simen, 1,195 m). In the east, the entire length of the divide lies within Bulgaria, from the Simen to the Kom summit in the south and north, respectively (Figure 1). The land area of the outlined part of the topographic catchment of the Visočica, to the gauging station in Visočka Ržana, is 403 km² (National Meteorological Service of Serbia/RHMZS, 2015).

The catchment of the Visočica belongs to the area of Visok, situated between the Temštica River in the west, Mt. Gora in the east (Bulgaria), Stara Planina in the northeast, the Mt. Midžor arch in the north, and Mt. Vidlič in the southwest (Petrović, 1999). It is at a distance of about 35 km from Pirot in the southeast. The region is typically mountainous, with a highly diverse and fragmented relief.

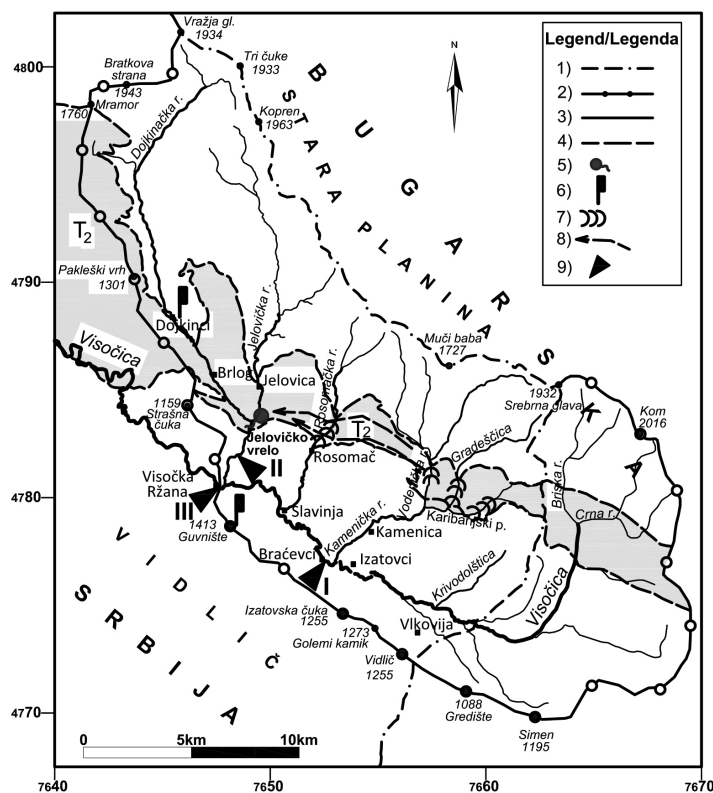


Fig. 1. Schematic representation of the river network in the study area within the Visočica River catchment Legend: 1) State border; 2) Topographic divide; 3) River; 4) Geological boundary of Middle Triassic karstified limestones and dolomites – T_2 ; 5) Jelovičko Vrelo (spring); 6) Rain gauging station; 7) Sinking zone; 8) Assumed direction of groundwater flow; 9) Hydrological station (I-Bračevci, II-Visočka Ržana on the Dojkinčica, III-Visočka Ržana on the Visočica)

The terrain generally dips to the northwest and governs the course of the Visočica – from the southeast (in Bulgaria) to the northwest. Formally, the Visočica rises in Bulgaria, on the southern slopes of Stara Planina, near the foot of the summits of Srebrna Glava (1,932 m) and Kom (2,016 m), in the Berovo Mountain area, at the junction of the Brlska and the Crna (Fig. 1). It flows to the south, and in the Visok area, at the Village of Komshtica, it makes a near right turn to the west, towards the nearby Serbian-Bulgarian border. Along its course through Bulgaria, it receives several small streams: left-bank tributaries – the Kamarska and the Kuratska, and right-bank tributaries – the Sredna and the Ranovishtica (Hristova, 2010). The Visočica enters Serbia at the Village of Donji Krivodol. In the Visok area, the Visočica has incised a deep channel associated with significant erosion of Lower Cretaceous flysch. The channel of the Visočica is the base level of erosion of the Visok area. In Serbia, the river flows very close to the steep slopes of Mt. Vidlič and, as a result, its catchment area is highly asymmetrical (Figure 1).

The left side of the Visočica Valley is represented by the northeastern slopes of Vidlič, whereas its right side belongs to the southwestern slopes of Stara Planina (Djurović & Živković, 2013). The left side of the valley between the villages of Donji Krivodol and Visočka Ržana is narrow, very steep and with no permanent tributaries. By contrast, the right side of the valley is ragged and there are numerous tributaries: the Krivodolštica, the Kamenička, the Rosomačka, and the Dojkinačka (incl. its tributary the Jelovička) (Figure 1). The headwaters of these tributaries emerge at the foot of the Stara Planina range and, on their way to the Visočica, they intersect various geological units at a right angle.

MATERIALS AND METHODS

The study comprised multidisciplinary research that can methodologically be divided into three components: 1) collection and review of available documentation, 2) field investigations, and 3) interpretation of results.

The collection and review of available documents were largely related to precipitation and discharge data. The data source was the National Hydrometeorological Service of Serbia (RHMZS), and its meteorological and hydrological yearbooks. The period from 1991 to 2013 was assessed. For the precipitation analysis, published data were taken on the rain gauging stations (RGS) at the villages of Dojkinci (alt. 880 m) and Visočka Ržana (alt. 700 m). The stations belong to the RHMZS monitoring network and are situated in the studied topographic catchments (Fig. 1). A parallel

analysis was conducted on annual precipitation totals, estimated amounts of long-term average precipitation, and precipitation trends.

For the hydrological analysis, published RHMZS river discharge data were collected from spatially best-located hydrological stations on the Visočica and the Dojkinačka, which are part of RHMZS's regular monitoring network. The hydrological station (HS) on the Visočica was at Bračevci (altitude of river cross-section "zero" = 747.07 m, catchment size = 227 km²), where RHMZS has been monitoring discharges since 1963. The HS on the Dojkinačka is at Visočka Ržana (altitude of river cross-section "zero" = 690.65 m, catchment size = 137.5 km²), which has been in service since 1981 (Figure 1). A comparative analysis was conducted on average annual and long-term average river discharges, lowest annual discharges, highest annual discharges recorded at a particular time, and monthly discharge distributions during characteristic years.

Field investigations included geological, hydrogeological and hydrological reconnaissance, as well as detailed geological mapping on certain localities. The geologic framework of the terrain was reviewed using the national geological map of the former Yugoslavia, scale 1:100.000, sheets K 34-34 Pirot and K 34-22 Belogradčik, along with their interpretations. The outcomes of geological reconnaissance were presented topographically on a scale of 1:100.000, and those of geological mapping on a scale of 1:25.000. The Geological Map of P.R. Bulgaria 1:500.000 was used to gain insight into the geology of the part of the catchment area of the Visočica that falls within the territory of Bulgaria.

RESULTS

Precipitation

Precipitation data were analyzed over the period 1991-2013 at the RGS of Visočka Ržana in the catchment area of the Visočica and the RGS of Dojkinci in the catchment area of the Dojkinačka (Figure 1). Figure 2 shows, in parallel, annual precipitation totals, long-term average amounts of precipitation, and precipitation trends.

The highest annual precipitation total at the RGS of Visočka Ržana was 1015.7 mm (2009), and the lowest 408.9 mm (2000). At the RGS of Dojkinci, the highest precipitation total was 962.2 mm (1995) and the lowest 283.3 mm (2011).

The long-term average at Dojkinci RGS was 634.1 mm and at Visočka Ržana 719.1 mm (Fig. 2). The months that recorded the highest

average precipitation levels at Visočka Ržana RGS were May (84.7 mm, or 11.8% of the annual total) and June (72.7 mm=10.1%), and the lowest were March (46.8 mm=6.5%) and February (49.8 mm=6.9%). At Dojkinci RGS, the highest average precipitation levels were measured in May (75.4 mm=12.1%) and June (65.9 mm=10.6%), and the lowest in March (30.5 mm=4.9%) and February (35.8 mm=5.7%).

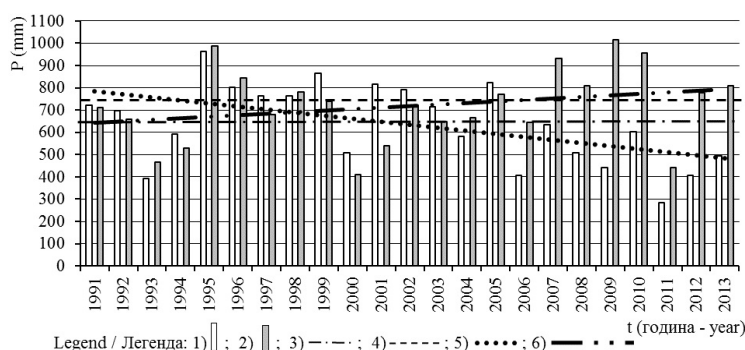


Fig. 2. *Parallel representation of annual precipitation totals, long-term averages and trends at Visočka Ržana RGS and Dojkinci RGS, 1991–2013. Legend: 1) Precipitation at Dojkinci RGS; 2) Precipitation at Visočka Ržana RGS; 3) Long-term average precipitation at Dojkinci RGS; 4) Long-term average precipitation at Visočka Ržana RGS; 5) Precipitation trend at Dojkinci RGS; 6) Precipitation trend at Visočka Ržana RGS*

An atypical spatial distribution is apparent: annual precipitation totals were higher at the hypsometrically lower Visočka Ržana RGS (alt. 700 m) than at Dojkinci RGS (alt. 880 m). A downward trend was noted at Dojkinci RGS and an upward trend at Visočka Ržana RGS (Figure 2).

DISCHARGES OF THE VISOČKA RIVER VS. THE DOJKINAČKA

The assessment was based on published RHMZS data for Braćevci HS on the Visočica (some 7 km upstream from its confluence with the Dojkinačka) and Visočka Ržana HS on the Dojkinačka (about 0.3 km upstream from the confluence with the Visočica), over the time period from 1991 to 2013 (Figure 1).

The average annual discharge of the Visočica from a topographic catchment of 227 km² was 1.65 m³/s, while that of the Dojkinačka from a topographic catchment of 137.5 km² was 3.76 m³/s (Fig. 3). The average discharge of the Dojkinačka was higher by a factor of about 2.3, while the topographic catchment was some 40% smaller. This ratio is only slightly

“mitigated” by the fact that a part of the water of the Visočica in Bulgaria has been transferred to the catchment area of another river (the Ogosta), which reduces the flow volume of the Visočica that reaches Serbia by about 31% on average (Ookoljić, 1987). The highest average annual discharge of the Visočica was recorded in 2005 and amounted to 4.69 m³/s, at which time the average annual discharge of the Dojkinačka was 5.97 m³/s. The lowest discharges were recorded in 1993: the average for the Visočica was 0.514 m³/s and for the Dojkinačka 2.35 m³/s. The highest average annual discharge of the Dojkinačka was registered in 2010 and amounted to 6.39 m³/s, whereas that of the Visočica was 3.99 m³/s. The lowest average discharge of the Dojkinačka was measured in 1994 and amounted to 2.21 m³/s, whereas that of the Visočica was 0.516 m³/s. It is apparent that during the study period the average annual discharge of the Dojkinačka was always higher than that of the Visočica (Figure 3).

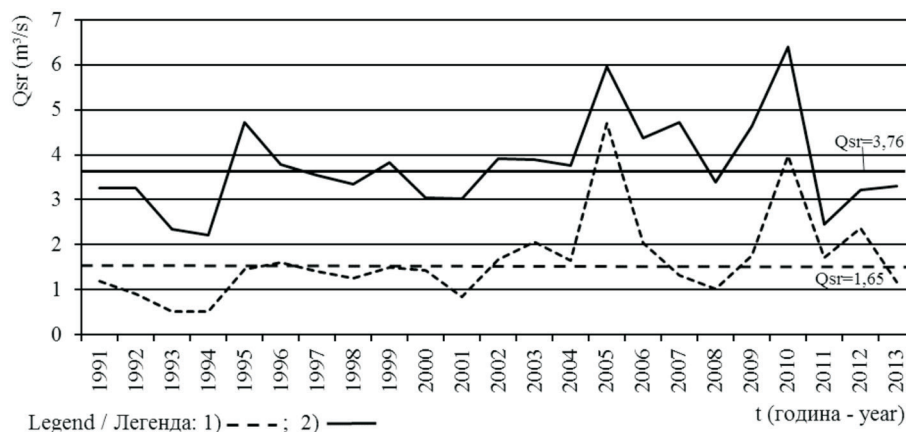


Fig. 3. Annual and long-term average discharges of the Visočica River at Bračevci HS and of the Dojkinačka at Visočka Ržana HS, 1991–2013; Legend: 1) The Visočica at Bračevci HS; 2) The Dojkinačka at Visočka Ržana HS

Over the 1961-2000 period, the estimated lowest average monthly discharge of 95% exceedance probability ($Q_{\min 95\%}$) and the specific minimum runoff (q_{\min}) of the Visočica were $Q_{\min 95\%}=0 \text{ m}^3 \cdot \text{s}^{-1}$ and $q_{\min}=0 \text{ L} \cdot \text{s}^{-1} \cdot \text{km}^{-2}$, and of the Dojkinačka $Q_{\min 95\%}=0.386 \text{ m}^3 \cdot \text{s}^{-1}$ and $q_{\min}=2.81 \text{ L} \cdot \text{s}^{-1} \cdot \text{km}^{-2}$ (Ristić, 2007). These values of $Q_{\min 95\%}$ and q_{\min} indicated that the sizes of the topographic catchments were invalid in terms of the water balance, and that there was underground re-distribution of water between the topographic catchment areas of the Visočica and Dojkinačka (Nikić, Letić & Nikolić, 2012).

In this regard, it was especially important to compare the lowest annual discharges of the Visočica and Dojkinačka (Figure 4). Based on

gauged discharges, it was clear that the lowest annual discharges of the Dojkinačka were considerably higher and that in some years the Visočica virtually ran dry.

The river channel of the Visočica at Bračevci HS was continuously dry over different periods in 1996, 2000, 2011, 2012 and 2013: in August 1996 for 17 days, in 2000 for four months (July, August, September and October) plus 12 days, in September 2011 for 18 days (no gauging was undertaken in October, November and December), in 2012 for four months (August, September, October and November) plus eight days, and in 2013 for four months (August, September, October and November). The Dojkinačka never dried out; the lowest discharge was 0.155 m³/s on 16 August 2000. That year the Visočica was dry for a total of four months and 12 days. The annual minimum discharge ratios (when the Visočica was not dry) were from 1.9:1 (2010) to 88.9:1 (2009), in favor of the Dojkinačka.

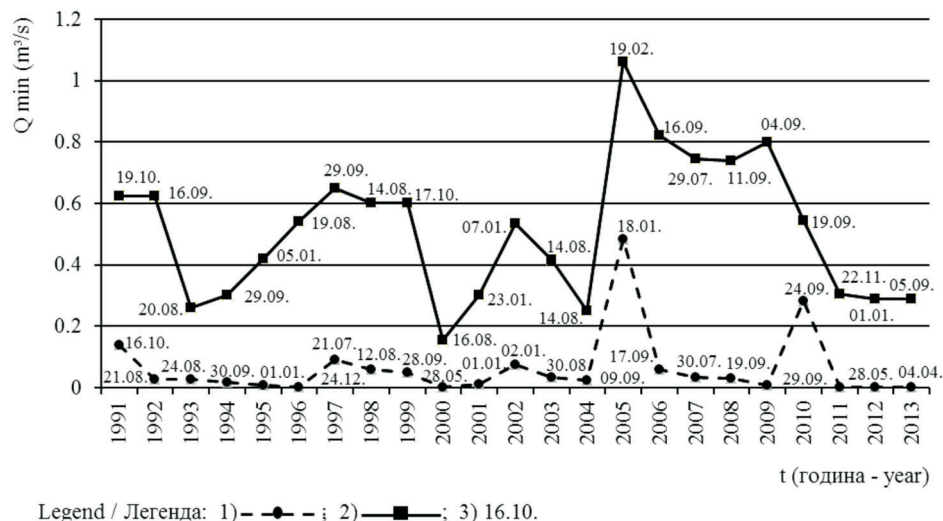


Fig. 4. Lowest annual discharges of the Visočica River at Bračevci HS and the Dojkinačka at Visočka Ržana HS, 1991-2013 Legend: 1) The Visočica at Bračevci HS; 2) The Dojkinačka at Visočka Ržana HS; 3) Date of recorded lowest annual discharge

The Visočica to the Dojkinačka discharge ratios in a single year can be illustrated by the average monthly discharges in 2000 (Figure 5). In all the months of that year the average monthly discharges of the Dojkinačka were higher (the Visočica was dry from 1 July to 13 November 2000), and the highest average monthly discharges of both rivers were recorded in the same month (March). While the Visočica was dry, the average monthly discharges of the Dojkinačka ranged from 0.235 m³/s to 0.435 m³/s.

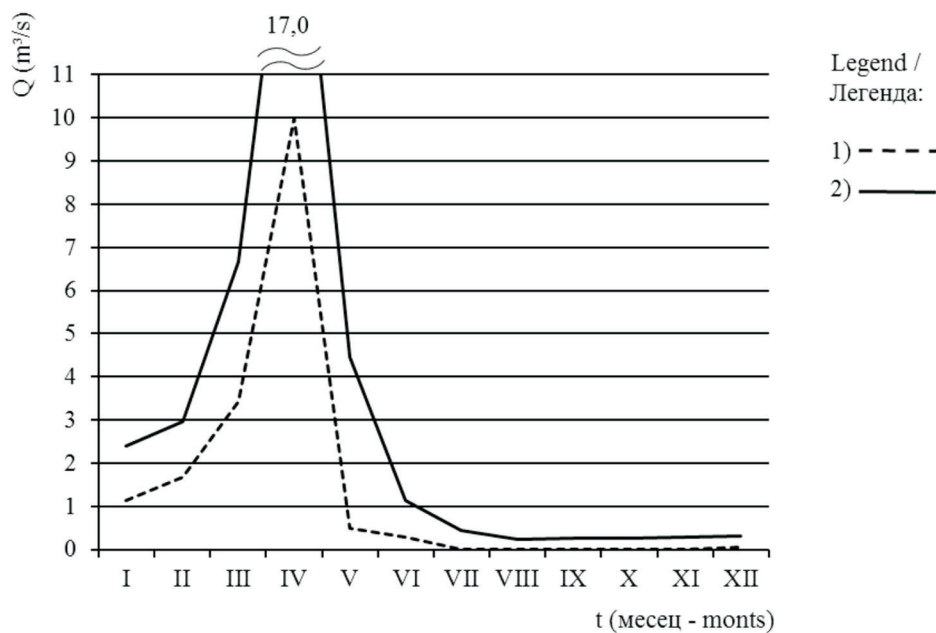


Fig. 5. Average monthly discharges of the Visočica (at Bračevci HS) and the Dojkinačka (at Visočka Ržana HS) in 2000. Legend: 1) The Visočica River; 2) The Dojkinačka

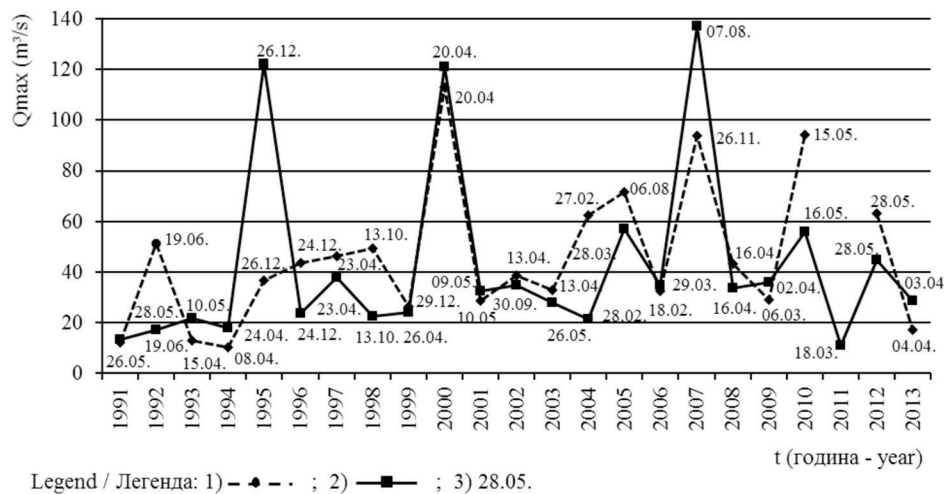


Fig. 6. Highest instant annual discharges of the Visočica and the Dojkinačka, 1991-2013. Legend: 1) The Visočica at Bračevci HS; 2) The Dojkinačka at Visočka Ržana HS; 3) Date of instant maximum discharge

Figure 6 shows the highest annual discharges of the Visočica and the Dojkinačka at some point in time during the year, over the period from 1991 to 2013. Contrary to the average annual discharges (Figure 3) and the lowest annual discharges (Figure 4), the highest instant discharges were not always in favor of the Dojkinačka.

Changes were noted in favor of either the Visočica or the Dojkinačka (Figure 6), but there was no particular pattern. This is likely due to the topographic catchment area of the Visočica, which is about 40% larger than that of the Dojkinačka, and because of the fact that heavy rainfall in part of the catchment area can cause instant high discharges (floods). The magnitude of this parameter is often in direct correlation with relatively short episodes of localized heavy rainfall.

Five years with characteristic annual precipitation totals were selected for a more detailed study of the hydrological regimes of the two rivers. The year 1995 was selected as the wettest year, as both rain gauge stations measured the highest precipitation levels, and 2011 was selected as the driest year. In 2013 more precipitation was recorded at Dojkinci RGS than at Visočka Ržana RGS, and in 2001 it was vice-versa. The year 1991 was selected to represent the year in which the average precipitation levels were roughly equal at the two stations.

It was noted that the monthly discharge distributions of the two rivers were roughly the same, although the annual discharges of the Dojkinačka (Figure 7b) were always higher than those of the Visočica (Figure 7a). April and May registered the highest discharges (primary peaks) of the two rivers. The Dojkinačka occasionally exhibited a secondary peak,

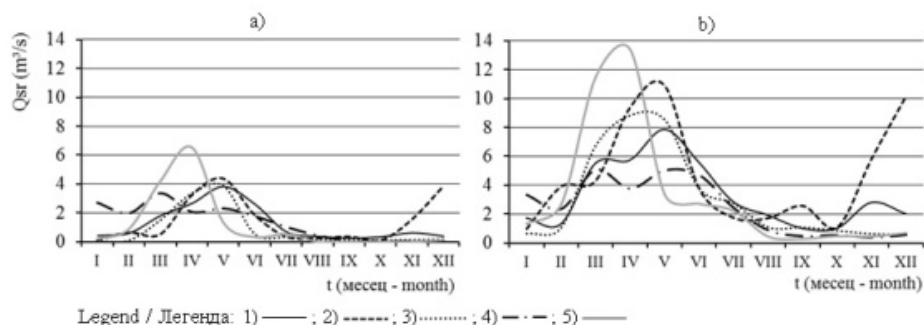


Fig. 7. Monthly discharge distributions of the Visočica and the Dojkinačka in five selected years. Legend: a) The Visočica at Bračevci HS; b) The Dojkinačka at Visočka Ržana HS; 1) 1991 year; 2) 1995; 3) 2001; 4) 2011; 5) 2013.

usually in November. The secondary peak of the Visočica was generally not pronounced, but was apparent in 2011, when a higher precipitation level was noted at Visočka Ržana RGS than at Dojkinci RGS. The discharge regimes of the two rivers are relatively simple: there is a pronounced wet season in the spring and a dry period in the summer and early autumn, such that the discharge regimes are typically mountainous, including snowmelt (Blagojević, Potić & Milovanović, 2007). Variations in monthly discharge distributions are attributable to temperature “deviations” related to snowmelt (or lack thereof), as well as different amounts of precipitation in parts of the studied catchments.

GEOLOGY

With regard to the geologic framework of the study area, the primary data source was the National Geological Map of the former Yugoslavia, scale 1:100.000, sheets K 34-34 Pirot (Andjelković, Krstić, Ćirić, Martinović & Bogdanović, 1975) and K 34-22 Belogradčik (Krstić, Kalinić, Rakić, Rajčević & Banković, 1974). Some of the specific geological features are based on mapping conducted for the purposes of the present research.

The study area within the catchment of the Visočica River, including the Dojkinačka, is composed of Precambrian, Mesozoic and Quaternary formations. The oldest rocks are Riphean/Cambrian crystalline schists, which make up the core of the expansive Stara Planina anticline. They are widespread along the Stara Planina mountain range, from the Berovo Mountains in the east to the headwaters of the Jelovička in the northwest. These formations are discordantly overlain by Lower Triassic sandstones and conglomerates, which form a long narrow belt along the right bank of the Visočica and extend from Bulgaria in the east to Bratkova Strana (the source of the Dojkinačka) in the northwest.

There is a Middle Triassic carbonate rock complex (T_2) roughly in the central part of the southern wing of the Stara Planina anticline, on the right side of the Visočica Valley (Fig.1). It concordantly overlies older formations and is characterized by alternating banks of pure, fractured and highly-karstified limestones and dolomites and less-karstified gnarled limestones. This rock complex features considerable lithological changes, from the east to the west. In the east, it is dominated by pure limestones and dolomites, and it turns into dolomitic, gnarled and sandy limestones in the northwesterly direction. This lithological change is especially pronounced west of the Dojkinci Valley, where there are virtually no lime-

stones and dolomites; the dominant rocks are sandy limestones, sandstones and marls (Nikić, 2003). Typical morphological features: springs, ponors, caverns, caves, and sinking zones, are indicative of the presence of highly karstified limestones and a karst aquifer (Nikić, 2003). Lower Jurassic sediments discordantly overlie the Middle Triassic sediments and are represented by conglomerates, sandstones and shales. The Middle Jurassic sediments are comprised of limy sandstones and quartz conglomerates, while those of the Upper Jurassic are made up of diverse limestone types: gnarled cherty, banked, massive, ridge-type, detrital, oolitic and marly. This carbonate rock complex is less karstified. The youngest member of the Stara Planina anticline is a Lower Cretaceous flysch-like complex into which the channel of the Visočica is incised and which largely builds up the right side and part of the left side of its valley. This complex is comprised of marly and sandy limestones, carbonate sandstones, marls and shales. The most recent rocks are Quaternary formations and alluvial deposits.

The dip of all the sedimentary sequences in the south wing of the Stara Planina anticline is mild, rarely greater than 20° . As a result of the dip, horizontal projections of thin geological formations are hydrogeologically significant. This is significant from a hydrogeological standpoint. Hydrogeological characterization and the spatial positions and interactions of permeable and virtually impermeable rocks that build up the study area are of key importance for proper interpretation of research results.

DISCUSSION

The spread of the Middle Triassic karstified limestones (T_2) on the right side of the Visočica Valley (Fig. 1), and the karst aquifer within them, is a key to interpreting the presented results and locating the source of the Visočica River.

The sources of all the right-bank tributaries of the Visočica (including the Krivodolštica, the Kamenička, the Rosomačka, and the Dojkinačka with its tributary the Jelovička) are situated immediately below the Stara Planina mountain range, downstream of which the water-abundant streams encounter a zone of Middle Triassic karstified limestones. The channels of the streams flowing above them include ponors and sinking zones (Figure 1). Especially significant in this regard are parts of the Karibanja and Gradašnica creeks, within the catchment area of the Kamenička, where alluvial sediments mask sinking zones that are up to 100 m long. Ponors are characteristic of a part of the course of the Vodenička (catchment area

of the Kamenička). The conditions are similar and include both sinking zones and ponors, in the channel of the Rosomačka, upstream from the Village of Rosomač (Nikić, 2003). During dry periods, the sinking rates of the Kamenička and the Rosomačka are such that incoming waters are completely lost. The downstream part of the channels remains dry for several months, which directly affects the discharge of the Visočica (Nikić, Jonić & Ristić, 2004). Sinking occurs during the entire year. At times of average and high discharges, the sinking rate increases but is difficult to observe visually because of the large amount of water in the river channel. Apart from receiving sinking river water, the karst aquifer formed in the Middle Triassic carbonate rocks is recharged directly by atmospheric precipitation.

The porosity of the other rocks that occur on the right side of the Visočica Valley, up to the Village of Visočka Ržana, is generally low, in fact, they are virtually impermeable. As a result, there is no significant infiltration. Precipitation is largely lost to surface runoff and evapotranspiration. These impermeable rocks constitute the underlying, overlying and lateral barriers of the karst aquifer and direct groundwater flow to the source of the Jelovička (Figure 1).

The source of the Jelovička (alt. 815 m) is a typical karst spring (the Jelovička is a left-bank tributary of the Dojkinačka). It is of the ascending type, with a submerged upward conduit, which is about 30 m long (Milanović, 2012). The maximum capacity of the spring is about 4 m³/s and the minimum some 200 L/s. There are times when the spring suddenly ceases to discharge water and just as suddenly resumes after one or two days (Cvijić, 1896; Čubrilović, 1995). In relative proximity to Jelovičko Vrelo a large number of other powerful springs have also been registered. These springs deliver water to the Jelovička. Additionally, there are several powerful karst springs in the very channel of the Dojkinačka, some 150 m upstream from the confluence of the Dojkinačka and the Jelovička. The junction area is called Vrelo (Eng. Spring) because of the large number of springs.

The geologic framework of the left side of the Visočica Valley is also important. In the Mt. Vidlič area, Upper Jurassic limestones tectonically overthrust Lower Cretaceous flysch from the southwest. These limestones are highly karstified and appear as pockmarked karst in places (Nikić, 2003). The overthrust dips to the southwest, or to the Visočica Valley, such that the precipitation infiltrated from Mt. Vidlič does not contribute to the Visočica's water balance, but flows underground to the Pirot Gorge and the Protopopinci and Krupac springs (Čubrilović & Nikić, 1999). There are no permanent streams on the left side of the Visočica Valley within the study area.

CONCLUSIONS

A parallel study was conducted on meteorological, hydrological, geological and hydrogeological parameters of the catchment areas of the Visočica (upstream from its confluence with the Dojkinačka) and the Dojkinačka. The conclusions of the study, as discussed above, were as follows:

The long-term average amount of precipitation in the catchment area of the Visočica (227 km²) amounts to 719.1 mm (according to the RGS of Visočica Ržana). It is greater than that of the Dojkinačka (137.5 km²), which amounts to 634.1 mm (according to the RGS of Dojkinci). As such, there is a greater abundance of water in the catchment area of the Visočica.

A comparative analysis of the relevant hydrological parameters of the two rivers indicated the opposite, especially with regard to the average and low river discharges. The average annual discharge of the Visočica (from a topographic catchment area of 227 km²), amounts to 1.65 m³/s, while that of the Dojkinačka (topographic catchment area 137.5 km²) is 3.76 m³/s. The average discharge of the Dojkinačka is higher by a factor of 2.3, although the topographic catchment area is about 40% smaller.

The sizes of the topographic catchment areas of the Visočica and the Dojkinačka were found to be invalid from a hydrogeological perspective, as there is local re-distribution of water to the detriment of the Visočica. Middle Triassic karstified carbonate rock formations play a key role in this regard; they are part of the geological build-up of the right side of the Visočica Valley and hold a karst aquifer. Sinking waters of the right-bank tributaries of the Visočica flow underground to a number of springs in the catchment area of the Jelovička (i.e. the Dojkinačka). The storage and retardation capacities of this karst aquifer affect the temporal discharge distributions of the Jelovička and the Dojkinačka. As a result, the Dojkinačka is distinctly perennial and continually increases the discharges of the Visočica.

The main conclusion is that the results of the present research corroborate Cvijić's claim (1896) that the source of the Visočica is situated in the catchment area of the Dojkinačka, and that Jelovičko Vrelo discharges its main headwaters.

The present case study and its outcomes are not significant solely from scientific perspective; they are also important in practical water management terms, given that the specific hydraulics of groundwater, not only of karst aquifers, need to be known and recognized in budgeting, protection, extraction, and management of available groundwater and surface water resources.

ACKNOWLEDGMENT: This paper was produced as part of a research project under the Fundamental Research Program OI176018 (2011–2015 component) funded by the Ministry of Science and Technology Development of the Republic of Serbia.

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MORPHOMETRIC ANALYSIS OF GOLYAMA KAMCHIA CATCHMENT USING GIS TECHNOLOGY

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ABSTRACT: Morphometric analysis implies a quantitative analysis of landforms and it is an important part of the most of geomorphological researches. It provides information about morphodynamic development of the area and could be used at different aspects of landuse planning and natural resources management. Geomorphological researches of river basins are of importance for water management because all hydrologic processes in the catchment are strongly related to the land forms characteristics. In this study a morphometric analysis is carried out on the river Golyama Kamchia catchment, located in the eastern part of Bulgaria. The investigated area exceeds 3000 km² and the highest stream order of the drainage system is 5. Morphometric parameters of the catchment area are determined on the base of ASTER digital elevation model and using geographic information system (GIS). Various linear features of the study area were calculated and analysed: stream number, stream order, stream length, bifurcation ratio. Areal features as drainage density, drainage pattern and form also are determined. The type of the relief and slope are taken into account, as well. The research confirms advantages of the remote sensing and GIS in geomorphological analyses and processing extensive and diverse data. Determining the morphometric properties of the river catchment contributes to better understanding of the drainage pattern, landforms and morphodynamic processes in the investigated area, and could be useful in the assessment of the river system, erosion processes as well as in river basin management.

Key words: morphometry, river basin, GIS, stream order, drainage density

INTRODUCTION

River catchment is the area where all hydrological processes are strongly related to the land form features. This is considered as a main unit regard-

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ing the water management and in this regards geomorphological investigations of river basins are of great importance for decision making and integrating the environmental issues in the management process.

The aim of the research is to determine the morphometric parameters of the catchment area and to show the possibilities of remote sensing and GIS technology in morphohydrological analyses. Various linear features of the study area were calculated and analysed as stream number, stream order, stream length and bifurcation ratio. Areal features such as drainage density, drainage pattern and form also are determined. The type of the relief and slope are considered too. The drainage network is delineated on the base of ASTER Global Digital Elevation Model (ASTER GDEM) using an ArcGIS Hydrology analyst tool. ASTER GDEM is a product of METI and NASA.

Morphometric analysis could be considered as a first step of geomorphological research. This is a quantitative analysis which gives information of the size, form and texture of landform, and interpretation of the results of the analysis could detect particularities of the morphodynamic of the area.

STUDY AREA

In this study morphometric analysis is done on the river Golyama Kamchia catchment. The area is located in the eastern part of Bulgaria and the river Golyama Kamchia is one of the main tributary of Kamchia river, the largest Bulgarian river which flows directly into the Black sea. The river Golyama Kamchia begins from the eastern Stara Planina mountain, flows to the East – North-East, forms a gorge between Preslavaska and Dragoevska mountains and receives its largest tributary on the left, the river Vrana. After the confluence the river flows in eastern direction and interflows with the river Luda Kamchia to form the Kamchia river. The river Golyama Kamchia basin includes the southern and the highest parts of the Eastern Danube plain, almost the whole Eastern Fore-Balkan and a part of the northern slopes of the Eastern Balkan (Stara Planina mountain). The study area is 3011 km² with low mountains and hilly relief and low lands (Figure 1). Low mountain and hilly relief is predominant in the south and central part of the study area while low lands compose northern and eastern parts. Land use types are mainly agricultural and forest.

In regards to the lithology, rock physical-mechanical properties, and chemical composition we can define the following groups: consolidated non-carbonate rocks, consolidated carbonate rocks, alternation of car-

bonate and non-carbonate rocks, loess and loess-like clays and unconsolidated non-carbonate rocks (Nikolova, 2010). Consolidated non-carbonate rocks are predominant in the river Golyama Kamchia drainage basin. They are presented by clay-sandy slates, sandstones, conglomerates and clays. These rocks are determined in Gerlovo hollow, at the northern low slopes of Preslavska and Dragoevska mountains and at the valley slopes of the river Vrana. Alternation of carbonate and non-carbonate rocks can be seen in Preslavska mountain and in the source area of the river Golyama Kamchia. Loess and loess-like clays cover the northern part of the investigated area, and are presented mainly on the left valley slopes of the river Vrana. Unconsolidated non-carbonate rocks are accumulated in the lower part of the river valleys and are well developed after the inflow of the river Vrana in the river Golyama Kamchia. Deluvial materials are accumulated on the left valley slopes of the river Golyama Kamchia and ground smooth transition between slopes and low flood terraces. Consolidated carbonate rocks are presented by limestones, dolomites and built a small part of the investigated area. They are located mainly in Shumen plateau, in the northern part of the drainage basin.

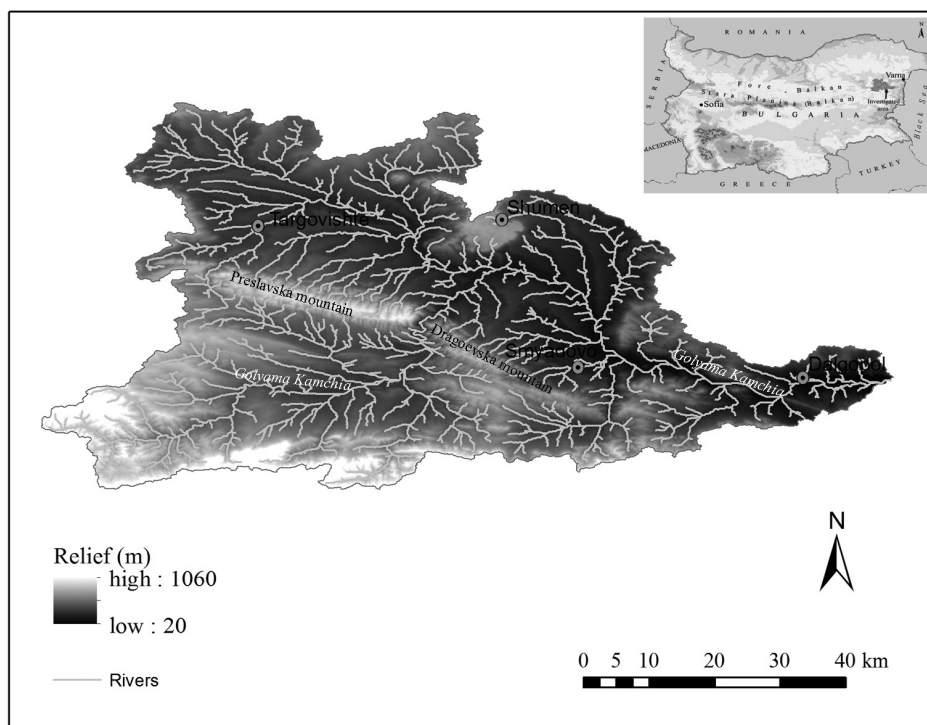


Fig. 1. Study area

The variety in the lithology and relief is a prerequisite for a development of complicated and dense drainage network. The average drainage density of the river Golyama Kamchia catchment is 0.64 km/km². The drainage network is dendritic and partly rectangular which is characteristic for low land and hilly relief, and also for folded areas. The catchment has wide upper and middle parts and narrow low part. This form of the basin could be a condition for floods in case of intensive rain. In this regards studying the watersheds and drainage network is essential for understanding the river behavior and assessment of flood risk.

RESEARCH METHODOLOGY

Morphometric analysis of the river catchment requires delineation of the drainage networks and watersheds. The drainage network is delineated in ArcGIS, ArcMap environment on the base of ASTER GDEM with 30 m horizontal resolution. For this purpose Spatial Analyst Tools – Hydrology were used. After determining the streams lines and basin areas morphometric parameters such as stream numbers, streams length, streams order, bifurcation ratio, drainage density, stream frequency, texture ratio and length of overland flow were calculated. The research is done in the following steps:

- Project raster – transforming the raster dataset to UTM projection, WGS 1984. Originally the images were in GCS WGS 1984 and recorded in decimal degrees. To present the area in a flat surface /screen and to make a calculations we need to project image and transform angular geographic coordinates in cartesian coordinates. It is done in ArcMap using Data Management Tools – Projections and Transformations.
- Checking the raster dataset, filling some sinks in the surface and removing small inaccuracies in the data. In this case Hydrology tool Fill of Spatial Analyst Tools is used.
- Determining flow direction. As a result a raster of flow direction from each cell to its steepest downslope neighbor is created (Hydrology – Flow Direction Tool).
- Delineating the drainage basin (Hydrology – Basin Tool). A new raster presenting all drainage basins in the area is created on the base of flow direction raster. This raster is converted into a polygon feature class. The catchment of the river Golyama Kamchia is exported in a new shape file. This polygon feature class is used for clipping extend and to extract the investigated area of the all ASTER DEM which covers a larger area.

- Determining the lines of flow accumulation (Hydrology – Flow Accumulation Tool). A new raster is generated on the base of flow direction and it represents a flow accumulation in each cell. The calculated highest values of the cell is 4 292 099. The lowest values show low or even null possibility for accumulation.
- Generating stream raster. It is done on the base of the flow accumulation raster and recalculating the cells using the Map algebra tool. Having regards the variety of the relief and geology in the investigated area, and aiming to include all streams, with permanent and temporal flow, in the analysis we consider the threshold area to create a stream is 5 km². The number of cells corresponding to this area at 30 m DEM resolution is 5556. In this case the new raster includes cells with value greater than 5556. After checking the results, reviewing the surface and making tests with different values of the pixels we accepted 2500 as a threshold value to be able to include also smaller lines with temporal flow. A new stream raster is calculated where all cells with a value greater than 2500 received a value 1 and all other are set to null. In this raster cells with value 1 present stream lines. The stream raster is used for determining of stream order.
- Determining the stream order (Hydrology – Stream Order Tool). At this step a numeric order is assigned to each segments of the streams. Strahler (1952) method is used for ordering by which stream order increases when streams of the same order intersect. The streams from the source which don't have any tributaries are streams of 1st order. When two streams of 1st order confluence they form a 2nd order stream, the confluence of 2nd order streams form a stream of 3rd order. Inflow of stream in the next order stream (for example 2nd order into 3rd order) does not change the order of the stream.
- Delineating watersheds as contributing areas above a set of cells (Hydrology – Watershed Tool). Regarding the morphometric characteristics of the investigated area we divided the catchment of the river Golyama Kamchia in 3 sub-areas: Basin 1 – the watershed of the river Vrana, Basin 2 – the watershed of the river Golyama Kamchia till the inflow of Vrana river and Basin 3 – the low part of the river Golyama Kamchia catchment (Figure 2). These raster datasets are converted into a polygon feature class.
- Converting the stream order raster file in a polyline vector file.
- Overlay of stream order with basin polygons (Identity) and calculating the drainage network morphometric parameters on the base of the generated attribute table. These parameters are given in Table 1.

Table 1. *Morphometric parameters*

Parameter	Description	Reference
Stream Order	Numeric order of the stream line. The lowest is the 1 st rank – streams that have no tributaries.	Strahler, 1952, 1957
Stream Length	Length of the stream, m	Horton, 1945
Bifurcation Ratio	Number of streams of any order to the number of streams of the next higher order	Schumn, 1956
Stream Length Ratio	The mean stream length of one order to the mean stream length of the lower order	Horton, 1945
Drainage Density	Total stream length to the unit area of the drainage basin, km/km ²	Horton, 1945
Stream Frequency	Total stream number to the unit area of the drainage basin	Horton, 1945
Texture Ratio	Drainage density multiplied by stream frequency	Smith, 1950
Length of Overland Flow	Half of reciprocal of drainage density	Horton, 1945

RESULTS

The morphometric analysis of the streams in the catchment of the river Golyama Kamchia shows that there is a dense drainage network related to the geology and topographic features of the catchment. The following linear properties of the drainage network are calculated: stream order, stream number, bifurcation ratio, stream length, mean stream length, stream length ratio. Areal properties such as drainage density, stream frequency, texture ratio and length of overland flow are also considered.

Stream Order and Number

The stream order is determined according to Strahler's method. The river Golyama Kamchia catchment is determined as an area of 5th order. The stream with the highest order is the main river in the basin. 1st order streams are the most numerous (Table 1, Figure 2). Their number is bigger in the source area of the main river and decreases in the middle and low part of the catchment. Of total 665 streams in the investigated area 526 are of 1st order. The number of 1st order streams could be considered as an indicator for development of erosion processes and more active geodynamic conditions. Having regards Basin 2 and Basin 3 there is one stream

of 5th order in each basin, but considering the whole catchment of the river Golyama Kamchia these 2 streams are parts of one river, the main river. The Basin 3 is determined as a 5th order drainage system but there is no stream of 4th order here. This basin takes the lowest and narrow part of the river Golyama Kamchia catchment area. Streams of 1st and 2nd order are well developed in this basin, indicating intensive erosion processes and low resistance of rock composition. There are also many 1st order streams that inflow directly in the 5th order river. Regarding the form of the basin which is wide in the heading part and narrow in the lower area of confluence the risk of flood is high in case of intensive rain. The number of stream in all investigated basins decreases from 1st order to the next higher order, which is in generally in accordance to the Horton's law about the drainage system (Horton, 1945).

Table 2. Stream number per stream order

Study area	Order1	Order2	Order3	Order4	Order5	Total
Basin 1	157	35	8	1	-	201
Basin 2	207	42	8	2	1	260
Basin 3	162	35	7	-	1	205
Golyama Kamchia catchment	526	112	23	3	1	665

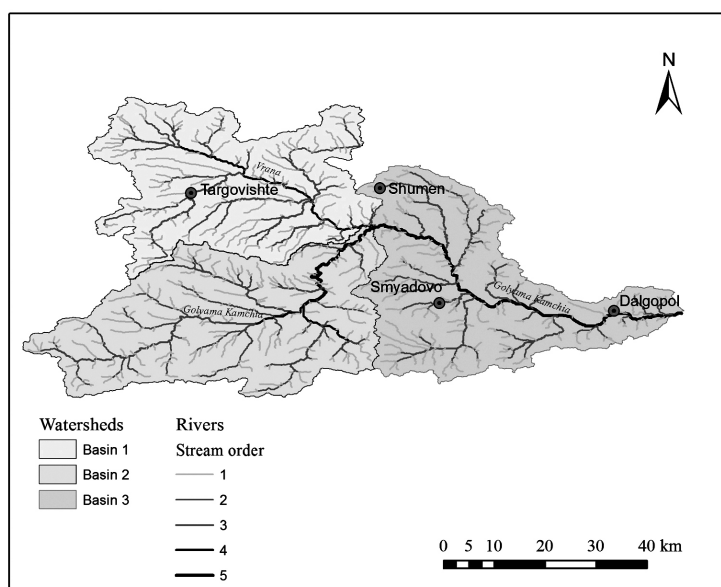


Fig. 2. Drainage network of the river Golyama Kamchia catchment

Bifurcation Ratio

The ratio of the number of streams of one order to the number in the next higher order is known as bifurcation ratio. This parameter varies generally between 3 and 5, but there are some exclusion and high values are observed at the ratio of order 3 to order 4 (Table 2). This could be related to the change of geodynamic conditions from the upper to the middle part of the river Golyama Kamchia catchment. The higher value of bifurcation ratio indicates a structural control on the river system and also shows a potential risk of floods because of the numerous streams in the neighbor lower order drainage area.

Table 2. *Bifurcation Ratio*

Study area	Order1/Order2	Order2/ Order3	Order3/Order4	Order4/Order5	Mean
Basin 1	4,49	4,36	8		5,62
Basin 2	4,93	5,25	4	2	4,04
Basin 3	4,63	5	7 (Order3/Order5)		5,54
Golyama Kamchia catchment	4,70	4,87	7,67	3	5,06

Stream Length

The sum of the lengths of all streams in different orders decreases from 1st to the higher orders while the mean stream length increases to the high orders streams (Table 3 and Table 4). An exclusion of this general rule are the 4th order rivers in Basin 1 the mean length of which is a bit lower than in the previous order. The very high value of mean stream length of the 5th order river (90,6 km), in relation to the values of previous orders (from 1,97 to 20,11 km) is related to the long and narrow drainage area in the middle and low part of the watershed.

Table 3. *Total Stream length, km*

	Order1	Order2	Order3	Order4	Order5
Basin 1	340,99	155,79	81,21	39,67	-
Basin 2	379,92	171,69	89,82	20,65	27,29
Basin 3	315,37	153,84	75,81	-	63,31
Golyama Kamchia catchment	1036,29	481,32	246,84	60,32	90,60

Table 4. Mean Stream length, km

Study area	Order1	Order2	Order3	Order4	Order5	For the basin
Basin 1	2,17	4,45	10,15	39,67		3,07
Basin 2	1,84	4,09	11,23	10,33	27,29	2,65
Basin 3	1,95	4,40	10,83		63,31	2,97
Golyama Kamchia catchment	1,97	4,30	10,73	20,11	90,60	2,88

Stream Length Ratio

The stream length ratio is calculated by dividing the mean stream length of one order to the mean stream length of the neighbor lower order. This parameter varies between 2 and 3 in the studied basins and in the whole catchment of the river Golyama Kamchia (Table 5), and shows generally slightly increasing to the higher orders. An exclusion of this tendency is the ratio at 4th to 3rd order which could be related to the changes in the topographic surface and rock composition, and is a result of the relatively low length of the 4th order streams. The high value of the stream length ratio at 5th to 4th order for the whole catchment indicates a long drainage channel and narrow form of the catchment in the lower part.

Table 5. Stream length Ratio

Study area	2/1	3/2	4/3	5/4
Basin 1	2,049444	2,280445	3,907714	-
Basin 2	2,227278	2,746593	0,919646	2,642541
Basin 3	2,257809	2,463997	-	5,85 (Order5/Order3)
Golyama Kamchia catchment	2,181343	2,497291	1,87343	4,51

Drainage density

The total length of all streams per drainage area is known as a drainage density. It is about 0,6 km/km² and is relatively constant of the studied basins and for the whole catchment area (Table 6). This indicates a dendritic drainage pattern. Slope, soil infiltration, rock resistance and vegetation cover are the factors controlling the drainage density.

Table 6. *Areal aspects*

Study area	Drainage Density (km/km ²)	Stream Frequency	Texture ratio	Length of Overland Flow
Basin 1	0,667	0,22	0,14	0,75
Basin 2	0,63	0,24	0,15	0,791
Basin 3	0,62	0,21	0,13	0,81
Golyama Kamchia catchment	0,64	0,22	0,14	0,79

Drainage frequency

Drainage frequency is related to the drainage density. It is calculated as a total number of streams per unit area. Similar to the drainage density this parameter tends to be constant regarding the three studied basins and the whole catchment of the river Golyama Kamchia (Table 6). A bit higher value of the stream frequency at Basin 2 in comparison to the other areas could be related to the lower rock/soil permeability in the low and hilly part of the basin and higher rate of erosion processes in the heading parts.

Drainage texture

Drainage texture gives an information about the relative spacing of streams in the investigated area. It is a product of drainage density and drainage frequency, and has a very small variation between the three basins and the whole catchment of the river Glyama Kamchia (Table 6). According to Smith (1950) the values of this parameter show a coarse drainage texture.

Length of overland flow

Length of the overland flow shows the distance which the water passes before to be accumulated in the stream. This parameter depends on the relief features and slope. It is calculated as a half of a reciprocal of the drainage density. The length of overland flow in the investigated areas varies from 0,75 (Basin 1) to 0,81 (Basin 3), Table 6. Small differences show similar relief features in the considered areas. The relief is predominantly low land to hilly. The length of overland flow for the whole catchment of the Golyama Kamchia river is 0,79.

Slope

The slopes of the most of the catchment of the river Golyama Kamchia are in the intervals 0-3 and 3-12 degree (Figure 3). The value of 12 degree is

considered as a limit value for delineating mountain areas. The steepest areas are observed in the most southern part of the investigated area. The variety of the slopes and topographic features influence on the surface runoff and the development of the drainage networks.

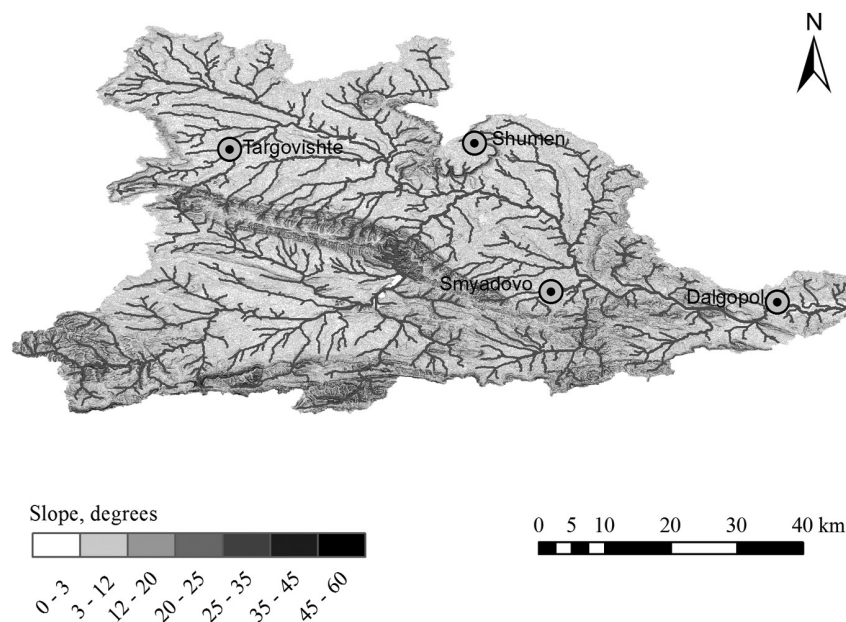


Fig. 3. Map of slopes in the river Golyama Kamchia catchment

DISCUSSION

Delineating drainage network and its analysis are an essential part of the hydrological and geomorphological researches. Development of river basins could be considered as a result of interaction between climate, land surface, rock composition, soils and vegetation cover. The importance of studying river basins is noticed by Horton (1945) who elaborated a quantitative method of analysing drainage basins. Considering different aspects of river basins Horton makes conclusions about the development of the drainage network known as "Horton's laws". According to Horton morphometric parameters of drainage basins and river systems have a regular relation to streams order. Making a classification of streams and river networks the author does not consider the streams with temporal runoff. Having regards the sensitivity of these flows they should be taken into account

as an indicator for the development of the basins. Based on Horton's researches Strahler (1952) suggests an improved classification of drainage network accepting that streams which have no tributaries are of first order, confluence of two first order streams forms second order stream, two second order streams form third order stream etc. Morphometric analysis of streams and rivers networks and their relation to the tectonic features is done by Filosofov (1960). He makes a hierarchical classification of the drainage network considering also temporal flows and emphasizing of the importance of stream orders and watersheds in geological and geomorphological investigations (1967). Delineating drainage network is an essential part of hydrological and geomorphological researches with application in river basin management, flood risk and landslide hazard assessment but it is often time consuming regarding large areas and large scale investigations. Because of these recent researches are pointed to the automatization and finding new algorithms for delineating watersheds and streams, using remote sensing and computer technology. Conclusions of Horton and Strahler about the drainage network are taken into account and confirmed in the publications of Mather & Doornkamp (1970), Nageswara et al. (2010); Malik, Bahat & Kuchay (2011); Parveen, Kumar & Kumar Singh (2012), Yunus, Oguchi & Hayakawa (2014), Farhan, Anbar, Enaba & Al-Shaikh, (2015), etc. These publications consider also application of GIS and remote sensing images for delineating stream network and calculating morphometric parameters.

In the present research morphometric analysis of the drainage catchment is done in ArcGIS environment. Strahler's method is used for determining stream order and also permanent and temporal streams have been taken into account. The results of analysis confirms general principles of Horton and Strahler regarding the hierarchic relations in the drainage area. Delineating of drainage network and watersheds is done on the base of ASTER GDEM. Comparison of the results with the stream order determined on the base of topographic map (Nikolova, 2005) shows reliability of the results calculated on the base of ASTER images. Other detailed morphometric researches of the river GolyamaKamchia catchment have not been done till the moment.

Reviewing some publications concerning the analysis of drainage structure on the base of DEM (Jenson & Domingue, 1988; Wang & Liu, 2007; Dragut, Csillik, Minar & Evans, 2013; Hutchinson et al., 2013) as well as the results of the present research emphasizes the importance of the accuracy of the DEMs in drainage network investigations. Future studies should be focused in examination of the initial data and finding the most proper way for filling sinks and removing data imperfections.

CONCLUSIONS

Morphometric linear and areal properties of the river GolyamaKamchia catchment are determined and analysed in the present research. The river system is of 5th order. Streams number and total stream length decrease from low to high order, while mean stream length increases. Bifurcation ratio tends to be relatively constant between 3 and 5 with some exceptions for the ratio of order 3 to order 4. Areal properties as drainage density, stream frequency, texture ratio and length of overland flow show dendritic pattern of the investigated catchment. Changes of the values of linear and areal properties of the drainage network indicate the relation to the relief, climate, rock composition and soil permeability. Using satellite images and GIS allows easy and fast way for making geomorphometric analysis on the large area. More attention should be given to the using of DEM for delineating drainage network, removing data imperfection and interpreting the results of the analysis regarding the whole physical-geographical environment and interaction between all natural components of the area.

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FLOODS OF TORRENTIAL TRIBUTARIES IN THE ZAPADNA MORAVA RIVER BASIN

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ABSTRACT: Although Jovan Cvijić did not research the topic of floods of great rivers and torrents, in the book “Geomorphology II” he gave some valuable explanations regarding the conditions of torrential flood occurrence in the watersheds (topography, geology, soil, vegetation), which are given as the introductory information on this subject in this paper. In this work, on the base of dataset of recorded torrential flood events, phenomenon of torrential floods in the Zapadna Morava river basin is spatiotemporally characterized. The dataset of 157 recorded torrential flood events with 11 casualties in the Zapadna Morava river basin is derived from the Inventory of torrential floods in Serbia for the period 1915–2013 (with 848 torrential flood events and over 133 casualties). Distribution of locations with destructive consequences, material damages and death toll, is presented by map. Intra-annual frequency of torrential flood occurrence shows peaks in June and May and inter-annual frequency within a research period shows linear increment. Torrential calamity from April, May and September in 2014 is the latest testimony about severe consequences of torrential floods as the most frequent hydrological hazards in Serbia. Since the extreme torrential flood events are going to be more frequent due to changes of meteorological conditions (i.e. frequency of extreme rainfall events), improvements in torrential flood risk management in Serbia are an imperative.

Key words: torrential floods, frequency, death toll

INTRODUCTION

Torrential floods, phenomenon of sudden maximal water discharges and high concentration of sediment in river beds, are typical hydrological extreme for tributaries of greater rivers with watersheds of small area, steep

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slopes and intensive soil erosion (Norbiato, Borga, Esposti, Gaume, & Anquetin, 2008; Gaume et al., 2009; Marchi, Borga, Preciso & Gaume, 2010; Dragičević et al., 2013; Petrović, 2015). Although Jovan Cvijić, a scientist of international acclaim, did not study the topic of floods of great rivers and torrents, he gave some valuable explanations regarding the conditions of torrential flood occurrence in the watersheds (topography, geology, soil, vegetation), in the book "Geomorphology II" (1926): "If the soil is composed of impervious layers, rainwater quickly runs over the soil. Even when the slope is slight, considerable quantity of water is able to sweep to the main riverbed. Over steep slopes water quickly drains even when the soil is made up of permeable layers, water of the strongest rainfall quickly flows over them." (p. 50). In the same book he also stated: "The forest coverage and deforestation have an impact as to impervious and permeable terrains. Forest trees prevent significant part of atmospheric deposits to fall directly on the surface which result in less soil erosion from atmospheric water. When it is under forest loose layer on the surface is protected from the water erosion." (p. 51)... "In the temperate highland areas due to snow melting sudden floods occur in the spring, which do not give over later, since season of summer rains, with the maximum atmospheric precipitation begins." (p. 52).

In the book "The Balkan Peninsula and South Slavic Countries – Basics of Anthropogeography" (1922), Cvijić wrote about direct impacts of geographical environment and natural hazards on population (p. 113), mentioning that heavy rainstorms and rapid flooding bring fear, discomfort and damages so that population get used to careful, detailed and very hard work in the field after they pass (p. 118). Although the risks of flooding are obvious, "population settles rather in valleys than on higher lands. Rivers and streams often demolish these settlements, but people patiently re-build them." (Cvijić, 1922, 327).

In this paper, phenomenon of torrential floods in the Zapadna Morava river basin is presented through temporal and spatial characterization of registered torrential flood events.

METHODS AND MATERIALS

Dataset of registered torrential flood events in the Zapadna Morava river basin is a part of the Inventory of torrential floods in Serbia (Petrović, 2014). In the Inventory, covering the period from 1915 to 2013, 848 torrential flood events with over 133 casualties are recorded. Materials for

dataset of torrential flood events in the Zapadna Morava river basin consists of (1) the book “Torrents in Serbia” by Gavrilović (1975) covering the period 1915–1970, (2) archival documentation of the newspaper “Politika” covering the period 1970–2012, as well as (3) available expert reports and particular explanations of torrential flood events.

Due to a foreseen problem with lack, limited or incomplete data, the dataset structure was based on the principle of collection of minimum data needed for further analysis: (1) name of torrent with flood event and macro watershed to whom it belongs, (2) affected locations and settlements, (3) date of event in format dd/mm/yy, (4) event description, (5) number of casualties, (6) damage description, (7) source of information (Petrović, Kostadinov & Dragičević, 2014). The important phases of the Inventory development (Figure 1) are: (1) defining the spatial and temporal framework and needed parameters, (2) data collection, (3) their organizing, (4) analysis, (5) distribution and use.

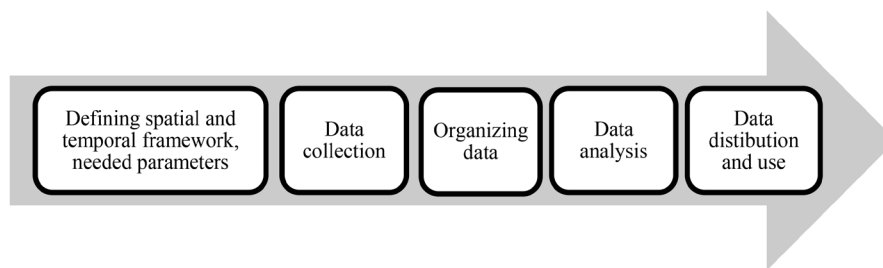


Fig. 1. *Development of the Inventory of torrential floods in Serbia* (Petrović, Dragičević, Radić, & Milanović, 2015)

STUDY AREA

Golijaska Moravica and Đetinja river join together nearby Požega forming the Zapadna Morava river (308 km long) that with Južna Morava river forms the Velika Morava river, the greatest national river system and basin with area over 37.000 km². The Zapadna Morava river basin is located in central Serbia and occupies the area of 15, 311 km². Specific characteristics of climate (moderate continental type with extreme rainfall episodes) and relief (terrain dissection, steep terrain and stream bed slopes), geological, pedological and vegetation cover, as well as changes of social-economical conditions such as land use and population migration, vary and perform a wide range of factors for torrential floods occurrence (Petrović, 2015) through history in the Zapadna Morava river basin.

RESULTS AND DISCUSSION

Dataset of 157 recorded torrential flood events with 11 casualties in the Zapadna Morava river basin for the period 1926–2013 is a result of this work. The first date of torrential flood event in Zapadna Morava river basin relates to the torrential flood of the Skrapež river ($A = 647.7 \text{ km}^2$), a left tributary of Đetinja river, happened in May 1926. The dataset finishes with the recent floods of the small direct tributaries of the Zapadna Morava nearby Čačak (Pridvorička and Jezdinska river) on 9th July 2013.

It is important to find out if the frequency and peaks of torrential flood occurrence on the level of the Zapadna Morava river basin substantially overlap with findings on the Inventory level and findings of research of maximal discharges in torrential watersheds in Serbia. On the Inventory level, frequency of torrential flood occurrence within a year shows primary peak in June and May and secondary peak in March and February and within a period of 99 years shows linear increment (Petrović, Kostadinov & Dragičević, 2014). According to Ristić, Radić, & Vasiljević (2009), two critical periods of torrential flood occurrence are defined: primary at the end of spring – May and the first half of June, and secondary at the end of winter – February and the first half of March.

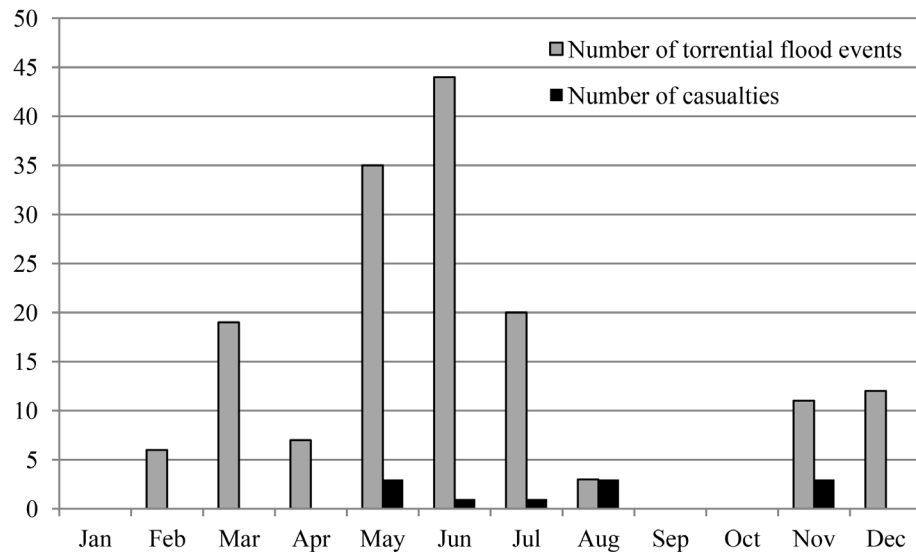


Fig. 2. Monthly distribution of historical torrential flood events

Monthly distribution of registered torrential floods in the Zapadna Morava river basin (Figure 2) indicates that the majority of floods occurred in June (44 or 28%) and May (35 or 22.3%) in warm season. The second peak in colder season of the year is recorded in March (19 or 12.1%), followed by December and November. Such results are an outcome of the rainfall regime of the hilly mountainous area in which the major and the most intensive rainfalls occur in June and May, while the second peak in March is triggered by strong showers and sudden snow melting, due to incoming warm air masses from south (Petrović et al., 2014). Extreme torrential flood events occur during summer months, July and August, after drought periods when high intensity rainfalls occur, as were the floods of Raška, Jošanica and Trnavska reka on 17 August 1956, Bjelica and Raška on 17 July 1986, many tributaries of Zapadna Morava on 10 July 1999, Pridvorička and Jezdinska river on 9 July 2013.

Consequently, the greatest number of casualties is recorded in summer months May, June, July and August (8) but in only 5 torrential flood events. Torrential floods of Raška, Jošanica and Trnavska reka took 3 lives in Novi Pazar on 17th August 1956, and 3 lives more on 18 November 1979. The event from 1956 was described in the newspapers "Politika": "Torrents swept down in the town, running through main streets with depth of 1.5 m and taking people, animals and houses."

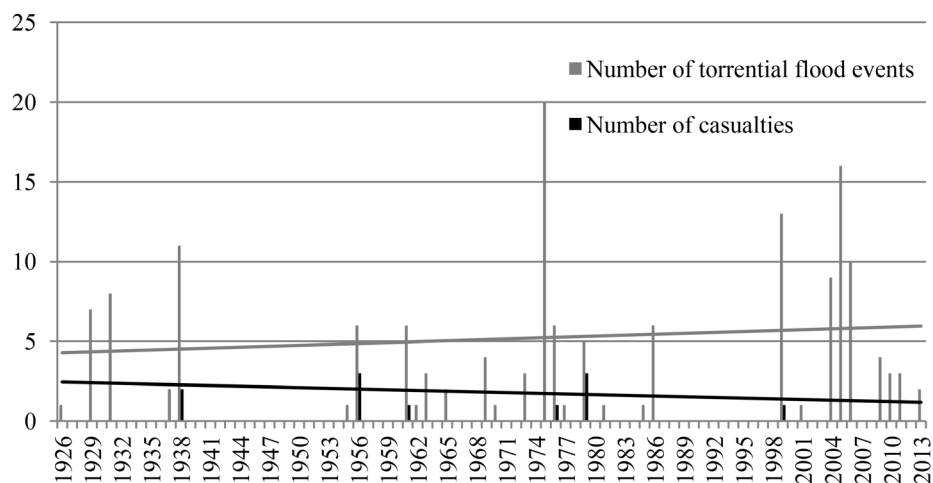


Fig. 3. Annual distribution of historical torrential flood events

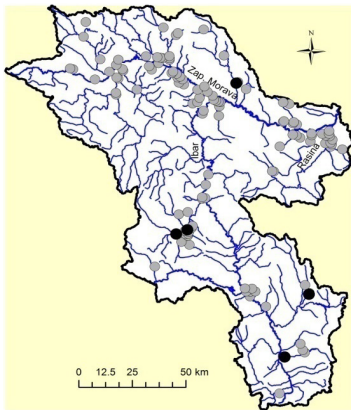


Fig. 4. Locations with severe material damages and casualties in the Zapadna Morava river basin as a consequence of historical torrential floods

According to the annual distribution for observed period (Figure 3), the peak years distinguished on the basis of number of events are 1975 (20), 2005 (16) and 1999 (13). In terms of death toll, the peak years are 1956 (3 deaths), 1979 (3) and 1938 (2), while in 1961, 1976 and 1999, 1 casualty per event respectively is recorded. The annual mean of registered torrential flood events (taking into account only years with recorded events) is 5.2.

Table 1. Temporal distribution of historical torrential flood events per periods

Time period	Number of events	Average per year	Number of casualties
1926-1960	36	1	5
1961-1990	60	2	5
1991-2013	61	2.7	1
Total	157		11

The increase of recorded torrential flood events is reflected in their distribution per periods: 1926–1960, 1961–1990 and 1991–2013 (Table 1). The average number of events per year per period shows an increment; average for the last period (2.7) is almost tripled in comparison with the first one (1). The noticed increase of frequency of events can be attributed to the changes of some climate conditions. For example, in the recent decades intensive rainfall showers (resulting in sudden water concentration in small watersheds and therefore flooding) are more frequent. Final outcome is a high increase of hydrological hazards and the agreement of scientists all over the world on that discharges with recurrence interval of 100 years become events with recurrence interval of 20 years, which increase the importance of studies on torrential floods. Due to magnitude of area and present soil erosion processes it is understandable that the large number of torrential floods in the Inventory is registered in the Zapadna Morava river basin (Figure 4). Natural conditions (steep slopes and soil properties) but also the forest exploitation and destruction have resulted in intensive erosion processes in some parts of the basin and frequent striking torrential floods causing disastrous damages including casualties (Petrović, 2015).

Table 2. Spatial distribution of historical torrential flood events per selected watersheds

Watershed	A (km ²)	No of events	No of casualties
Ibar	7925	49	10
Đetinja	1187	16	-
Rasina	956	12	-
Gruža	791	11	1

The greatest number of torrential flood events is recorded in the watersheds of Ibar, Đetinja and Rasina (Table 2). The historical torrential flood events in the Ibar river basin took the most casualties (10 lives). Although there is a trend showing the decrement of number of casualties, it is important to foster education and communication about risks (Kovačević-Majkić et al., 2012) and develop modern torrential flood warning system.

Two main traffic routes presenting a skeleton of transport network in the Zapadna Morava river basin: Ibarska magistrala, Belgrade – Raška (crossing the river basin in the direction N-S) and Kruševac – Požega (along the Zapadna Morava valley, crossing the river basin in the direction E-NW) were often interrupted due to destructive torrential flood events. Beside the traffic infrastructure damages, severe damages of households, industry capacities and agriculture areas (Figure 5) are recorded. However, it should be taken into account that destructive effects of torrential floods are often multiplied by anthropogenic factors such as wild dumps in river beds.



Fig. 5. Flood in Kraljevo, April 2010 and Novi Pazar, May 2011
(Photo by tanjug.rs and novosti.rs)

CONCLUSIONS

According to analysis of dataset of torrential flood events in the Zapadna Morava river basin, there are two main findings: (1) Within a year there is a primary peak of registered torrential flood events in June and May, and secondary peak in March; which greatly corresponds to the monthly distribution of all registered events on the Inventory level. (2) Frequency of torrential floods occurrence within a researched period records an increment. Datasets of recorded torrential flood events in river basins in Serbia can significantly contribute to the torrential flood risk management, implementation of the Flood Directive (2007/60/EC) and the INSPIRE Direc-

tive (2007/2/EC; data theme: natural risk zones). Furthermore, recognizing the torrential floods as a specific pressure in the Zapadna Morava river basin, this phenomenon should be significantly treated in the concept of integrated river basin management according to Water Directive (2000/60/EC) (Borisavljević & Kostadinov, 2012). Therefore, torrential flood control including the technical and bioengineering works in watersheds should become an imperative.

ACKNOWLEDGEMENT: This paper is a part of the project "Geography of Serbia" (grant 47007 III) financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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HYDROGEOLOGICAL CHARACTERISTICS OF SUVA PLANINA IN THE EYES OF JOVAN CVIJIĆ AND TODAY

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Saša Milanović, Ljiljana Vasić, Marina Čokorilo Ilić

ABSTRACT: The significance of karst terrains lies in the fact that considerable amounts of high-quality groundwater are stored there and karst springs are found generally on the periphery of karst massifs. In Serbia, populated areas in eastern Serbia largely obtain their drinking water supply from karst water sources. Unfortunately, most of this high-quality water remains unused. Mt. Suva Planina (meaning “dry mountain” in English) is a rare example of the use of karst groundwater for drinking water supply of nearby towns and villages. The springs of Studena, Mokra, Divljana and Ljuberađa have been captured by the Public Water and Wastewater Utility of the City of Niš. Dušnik Spring provides drinking water supply for the town of Gadžin Han, the springs of Sopotnica and Vrgudinac for the villages bearing the same names, and so on. Additionally, there are many low-capacity springs used as local village taps. Initial information about Suva Planina, its karst features, groundwater, groundwater flows and karst springs came from Jovan Cvijić in 1895 (in *Caves and Underground Hydrography of Eastern Serbia*) and 1986 (in *Springs, Mires and Waterfalls*). Cvijić reported a more detailed study of the morphological features of Suva Planina in 1912, in his paper *Suva Planina and Valožje Karst*, published in the first issue (volume) of the Bulletin of the Geographical Society; Cvijić was its founder and first president.

Key words: karst, hydrogeology, karst spring, Suva Planina, Jovan Cvijić

INTRODUCTION

Suva Planina is located in southeastern Serbia. In geological and geographical terms, it belongs to the Carpathian-Balkan arch. It is about 45 km long and 15 km wide, trending NW-SE, with elevation zones ranging from

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250 to 1810 m above sea level (Trem is the highest summit). Suva Planina is surrounded by gorges on all sides, such that it is a distinct feature in its setting. The Nišava River (or, more precisely, the gorges of Bela Palanka and Ostrovica and the Niš Valley) constitutes its northern/northwestern boundary, the Koritnica River and its gorge are the eastern boundary, and the Lužnica River its southeastern/eastern boundary. To the west, the mountain gradually descends toward the Gorge of Zaplanje.

Jovan Cvijić was the first to undertake exploration of Suva Planina's caves and subterranean hydrography. He identified three mountain units: a horseshoe-shaped part, the Crvena (*Red*) River arch, and the Valožje Plain. The Valožje Plain is interesting from a morphological perspective; it ends with a horseshoe-shaped steep limestone ridge to the north. Suva Planina's altitude is 1400–1500 m and there are series of peaks (the highest is Trem). Cvijić (1912) mentions web-like karst features: a network of depressions, "slopes", and sinkholes, with limestone hills and peaks between them. There are no major surface streams; creeks whose water is lost to alluvial ponors rise from the springs of Rakoš Česma, Smrdana and Vrljka.

The most typical surface features of Suva Planina are sinkholes, largely developed in karst. More precisely, they are generally found in flat parts of the karst massif, while on the slopes they occur rarely or are absent altogether. Sinkhole density in some parts is very high (more than 100 per 1 km²); such areas are called "pockmarked karst". The sinkholes in the pockmarked karst are chaotic, distributed across the surface with no particular pattern. However, some of them do occur in sequences, along faults or on the bottom of dry dolines. Solitary sinkholes have also been registered.

HYDROGEOLOGY

The karst aquifer developed within Suva Planina is characterized by highly favorable groundwater flow properties, with characteristic solution porosity. Highly karstified parts generally correspond to privileged tectonic zones. However, active karstification zones are often filled with secondary material. Primary porosity is much less significant and decreases with depth. The hydrogeological parameters, which define the flow characteristics of the karst aquifer, have rarely been determined through exploratory activities undertaken to date. Groundwater circulates through developed systems of fractures, conduits and caverns. Turbulent flow is predominant and there are considerable discharge fluctuations.

The aquifer is recharged by infiltration of precipitation, which is especially intensive in the higher parts of Valožje, where the karst is very



Fig. 1: View of Suva Planina from Koritnjak (https://sr.wikipedia.org/wiki/Suva_planina)

thick and the possibility of surface runoff small. Recharge on account of infiltration of water from surface streams is negligible because they are virtually non-existent on Suva Planina (the only noteworthy creek comes from Rakoš Česma Spring in the Valožje area – the central part of the Suva Planina massif, which sinks almost immediately).

The highest rate of recharge of the karst aquifer occurs at the end of winter and during the spring months, when the snow cover melts. However, because of the rising water table and saturation, the aquifer is often unable to absorb all the water and a large proportion is lost to runoff along the edges of the karst massif. In the summer, there is less precipitation but frequent heavy rainfall events affect the rate of recharge. The effective infiltration rate is the highest during this period, given the lower water table and greater thickness of the vadose zone.

The Suva Planina karst is drained *“solely via springs at the foot of the mountain, emerging at points of contact with impermeable rocks. There are only a few weak springs on the mountain itself, hence its name. Rakoš Česma is the most significant spring in the Suva Planina massif, as it never dries out”*¹. Other important springs with noteworthy discharges include Studena, Bojanine Vode, Dušnik, Sopotnica, Ropot and Ždavina, which drain the northern and northwestern parts of Suva Planina, followed by Lužnica Springs or Ljuberađa Springs, which drain the southern part of the massif. The eastern/northeastern part of the mountain is drained by the springs of Vrgudinac, Mokra, Divljana, Koritnica, Bežište, and many other minor springs.

Cvijić mentioned some of the more important springs in *“Springs, Mires and Waterfalls”* (1896). Speaking of Suva Planina, he singles out Studena Spring (a.k.a. Golemo Vrelo) and states: *“...south of the village of Golema Studena there are twelve springs along a dolomitic arch, which are collective-*

1 Petrović B. 2014: General characteristics of karst groundwater flow of Svrljiške planine Mt. and Suva planina Mt. pp 341.

ly called Golemo Vrelo (Eng. Big Spring); after about 1 km the waters flow into the Jelašnica River and constitute its richest tributary. The small doline, through which they flow, is in red limestone; its gradient and flow velocity are very high. As a result, the water from these springs is distributed to numerous small stream channels and there are about 20 watermills and a cloth rolling mill. The water is very rich in $\text{Ca}(\text{HCO}_3)_2$, which is deposited at the confluence because it spreads there; that is why there is a piece of flat land with calc tufa, where a large number of Donja Studena houses are located. There is no doubt that the water discharged by these springs, which dissolves calcium carbonate more readily than magnesium carbonate, contributes to the dolomitization of the rocks, through which it flows underground". Indicative of the importance of this spring is the fact that it was the first spring captured, in 1962, for drinking water supply of the City of Niš. On the spring site, the water at the lowest point of contact

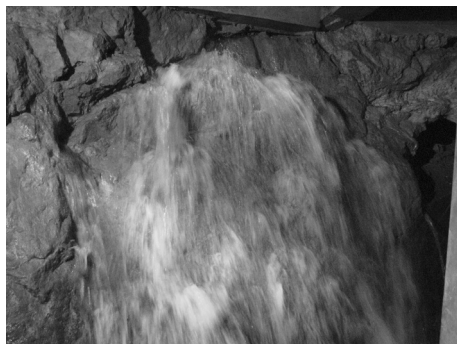


Fig. 2. Studena Spring: water emerging from fractures (photo by Ristić Vakanjac)



Fig. 3. Studena water supply source: spring captures (<http://www.jkpnaiissus.co.rs>)

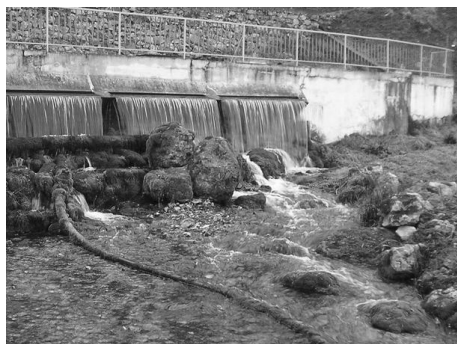


Fig. 4. Dušnik Spring (<http://www.stazei-bogaze.info>)



Fig. 5. Mokra Spring capture (photo Ristić Vakanjac)

between the dolomites and red Permian sandstones emerges in the form of a cluster of springs. It is discharged through numerous fractures of different sizes, from several centimeters to as much as 0.5 m (Fig. 2). A total of 14 occurrences have been captured by means of three separate caps (Fig. 3). The summary spring discharge, according to the Naissus Water and Wastewater Utility, ranges from a low of 240 l/s to more than 400 l/s. The long-term average is 327 l/s. The recession period is very long and indicative of a high retention capacity of the limestone drained by the cluster of springs.

The next spring described by Cvijić is Dušnik (Fig. 4). It emerges “above Gornji (Eng. Upper) Dušnik, where the sides of Suva Planina break up and form the Gorge of Zaplanje. Water gushes at 10–15 points and tumbles down. It seems to me that more water flows out of here than from Lake Žagubica. Calc tufa is deposited below the spring”. Today, this well is also captured and used to provide drinking water supply to parts of Gadžin Han Municipality.

With regard to the springs on the southern side of Suva Planina, Cvijić says that the intermittent Ropot Spring is of interest. “From this spring a lot of strongly bubbling water emerges up to mid-April, then dries out; the dry period is long, probably until the autumn”.

Mokra Spring (called Mokranjsko Vrelo by Cvijić) is located immediately above the Village of Mokra, near the Koritnica River. Cvijić noted: “The water emerges from numerous fractures at two locations and the spring forms a basin whose diameter is about 9 m. A river, which is about 5 m long, flows out of it and the amount of its water is similar to that of the Mlava flowing out of Lake Žagubica. The water coming from this spring flows among karst limestone rocks, driving numerous watermills and one cloth rolling mill. It empties into the Koritnica”. It should be noted that Cvijić explored the environs of Mokra Spring around Easter in 1894, and Mlava Spring a year earlier (in May 1893). A comparison of discharges without studying the pluviographic regime during corresponding periods can be misleading. From today’s perspective and based on monitoring data provided by the Naissus Utility, which also uses this spring for the water supply system of the City of Niš (Fig. 5), the characteristic discharges are: $Q_{\min}=0.12 \text{ m}^3/\text{s}$, $Q_{\text{av}}=0.31 \text{ m}^3/\text{s}$ and $Q_{\max}=2.50 \text{ m}^3/\text{s}$ (Fig. 6). As such, Mlava Spring delivers more than five times the volume of water discharged by Mokra Spring. On the other hand, the estimated drainage area of the Mlava of roughly 120 km^2 is about four times larger than the assumed drainage area of Mokra Spring (about 36 km^2).

During the course of his exploration of Suva Planina springs, Cvijić also measured water temperature (Table 1 below).

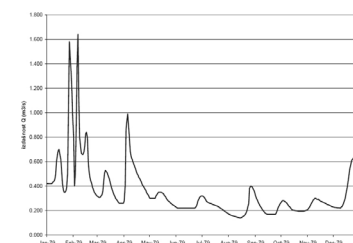


Fig. 6: Mokra Spring 1979 hydrograph (Ristic, 2007)



Fig. 7. Komarnički Vir (Ljuberađa), (Cvijić, 1896), photo by Stanojević, Đ. M.

Tale 1. Water temperature on Suva Planina (Cvijić, 1896)

Spring	Location	Type of rock	Temperature
Mokra	Village of Mokra, above Bela Palanka	Limestone	10.5°C
Dušnik	Above the village of Dušnik (Zaplanje)	*	10.0°C
Golemo Vrelo	Donja Studena	Dolomite	9.5°C

Note: Measured around Easter of 1894.

In addition to the above springs, when speaking of waterfalls and rapids, Cvijić (1896) mentions Lužnica Springs and Ljuberađa Springs, in connection with a waterfall on the Lužnica River, above the plunge pool called Komarnički Vir. *“The channel of the Lužnica, incised in limestone, is the narrowest at the lower exit from the gorge, above the Village of Ljuberađa, and there are high grubbed limestone rocks. The cliff over which the water tumbles is 5 m high, comprised of limestone, with only the right-hand end suffused with calc tufa. The calc tufa has not been deposited by the Lužnica, but by a powerful spring on the right bank of the Lužnica, which influenced the very cliff into the river; after a road was built through the gorge, the water from that spring was routed via an underground conduit and now drives watermills and therefore no longer increases the height of the cliff....Komarnički Vir, which is below the waterfall, is bubbly, incised in limestone, 10 m long in the direction of the river width, 6–7 m wide and 3–4 m deep”*. In that report Cvijić did not provide a detailed analysis of Ljuberađa Springs. However, he did point out their overriding importance in terms of the origin of Komarnički Vir (Fig. 7).

More than 60 years after Cvijić, Milić, Č. (1960) described these springs in his paper “Lužnica Springs” and indicated that they represent a large group of springs distributed along and above the Lužnica River, at rkm 19.8 to 18.8 km from its confluence with the Vlasina River.

Among occurrences of concentrated water discharge, the lowest is the spring of Arnautsko Vrelo, captured to provide drinking water supply to the town of Babušnica. Emerging water has been noted upstream from this spring, along the river channel, as well as in Komarnički Vir, where groundwater flow has been observed along the left and right sides. Water emerging in a cluster pattern has also been registered downstream from Komarnički Vir, up to the bridge on the Arnautsko Vrelo capture and further downstream.

Ljuberađa Spring is the main point of emergence of water from the right side above Komarnički Vir, which has partly been captured to provide drinking water supply to the village of the same name. This point of discharge is masked by rather thick calc tufa deposits.

Upstream from a waterfall formed in the calc tufa deposits, on the left side of the valley, there are two springs collectively called Krljetinsko Vrelo. It is a cluster type water source, about 34 m long, with the most frequent emergence of water in the downstream part.

Upstream from a river bend (the end of a meander on the right-hand side of the valley), relatively strong emergence of water is noted below a road, along a length of about 11 m, at a rate of some 100 l/s. Immediately above this powerful spring, there is also some minor drainage in the river bend area, on both sides of the valley. According to the author, it is a widespread cluster of springs along a large fault whose general trending is WNW-ESE. This fault is associated with the most upstream springs, of which the first occurrence upstream from the meander is the most powerful ($Q = 10 \text{ l/s}$).

CONCLUSION

In Serbia, drinking water supply for 70% of the population relies on groundwater. From a hydrogeological perspective and in territorial terms, about 30% of the inner part of the country is karst, which is associated in the east with the Carpathian-Balkanian geotectonic province and in the west with the Inner Dinarides (Dinaric geotectonic province). The fact that certain European capitals (e.g. Vienna, Podgorica, Tirana, Skopje) rely largely or solely on karst aquifers for drinking water supply is indicative of the quality and quantity of karst groundwater. In Serbia, cities that obtain their water supply from such sources are e.g.: Niš, Valjevo, Bor, Pirot, Bela Palanka. Unfortunately, for the most part this high-quality groundwater still remains unused. One example is the Beljanica karst massif where the summary discharge of all karst springs that drain the massif exceeds $4 \text{ m}^3/\text{s}$, but only a portion of the water discharged by Belosavac Spring is used for drinking water supply of Žagubica.

Suva Planina is a karst massif in southeastern Serbia. There are springs along its edges, generally at the interface with non-carbonate rocks. Contrary to Beljanica, most Suva Planina springs have been captured and provide drinking water supply to the City of Niš (Studena, Mokra, Divljana, Ljuberađa) and Gadžin Han (Dušnik Spring), as well as a number of villages (e.g. Vrgudinac, Sopotnica). Cvijić drew attention to the importance of some of these springs back in 1896. In *"Springs, Mires and Waterfalls in Eastern Serbia"* he described the major springs that drain karst massifs in southeastern Serbia, five of which are located on Suva Planina: Studena, Mokra, Dušnik, Ropot, and Lužnica Springs (the last mentioned only in connection with the analysis of Komarnički Vir). In addition to the

geographical location of each spring, Cvijić indicates how each of them is formed and provides a brief account of the spring type, discharge regime, use, water temperature, and the like.

Today, apart from the fact that the region of Niš relies on Suva Planina's groundwater because of its quality and quantity, this mountain is a protected area due to its exceptional morphology and karst features. Various degrees of protection apply. Also, some 18,176 hectares of the land has been designated as a Special Nature Reserve.

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PREKONOŠKA CAVE AT THE END OF THE 19TH CENTURY AND TODAY

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*Boris Vakanjac***, *Saša Milanović**, *Ljiljana Vasić**, *Milorad Kličković****

ABSTRACT: In Serbia, the initial speleological exploration was conducted at the end of the 19th century by Jovan Cvijić and is associated with Prekonoška Cave. In his paper "Prekonoška Cave" published back in 1891, Cvijić presented a detailed plan and cross-section of that cave, as well as its origin. At that time, the length of the detected and explored cave conduits was 400 m. Since then, nearly 125 years later, only an additional 35 m of conduits have been uncovered such that, according to the Speleological Atlas of Serbia, the total length of the conduits is 435 m. After Cvijić's exploration and the publication of the above study, both speleology and this cave became more visible. At that time, because of its splendor and rich natural ornamentation, Prekonoška Cave was guarded by the Serbian Gendarmerie. Following World War II, the preparation of the entrance to the cave and the cave itself for the first tourist visits began in the early 1960's. Unfortunately, the cave has never been opened to tourists. In the latter half of the 20th century, the cave entrance was vandalized, the lighting ripped apart and stolen, and the natural ornamentation broken and partly removed. Today, the cave is open, unsecured, and unsafe for curious tourists. Only trained and duly equipped speleologists can move inside the cave. It is important to note that this now largely neglected cave has been designated as a nature monument and is therefore legally protected.

Key words: Svrljig Mountains, Prekonoška Cave, Golema Dupka, Jovan Cvijić

INTRODUCTION

Prekonoška Cave and another cave in its immediate vicinity called Golema Dupka are located in the western part of the Svrljig Mountains, within

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Fig. 1. Sign describing Prekonoška Cave (ph. by V. Ristić Vakanjac)

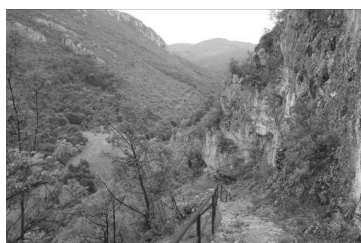


Fig. 2. Footpath, with handrail, to the entrances to Prekonoška Cave and Golema Dupka (ph. by B. Vakanjac)

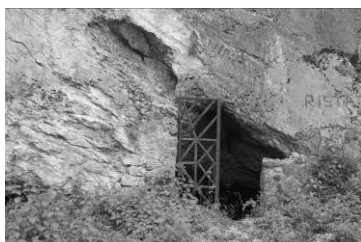


Fig. 3. Entrance to Prekonoška Cave (ph. by B. Vakanjac)

the administrative boundaries of the Village of Prekonoga. They are both accessed from the northwest, via road E-771 which connects the city of Niš with Svrljig, Tijovac, Ponor and Knjaževac. Just ahead of Svrljig, there is a right turn onto a 2.1 km long paved road that leads to Prekonoga. The paved road ends in the middle of the village and from there a 1.5 km long trail leads to the cave, which can be traversed in an off-road vehicle or on foot. At the end of the 1.5 km trail there is a sign with basic information about the cave, its plan and cross-section, and a map showing the way to the cave (Figure 1). The last 250 m is a narrow, steep footpath, with handrails in places, which leads to the entrance to the cave (Figure 2). The entrance to Prekonoška Cave is protected by a gate (Figure 3), while the entrance to Golema Dupka is open/unsecured (Figure 4).

GEOGRAPHICAL LOCATION AND GEOMORPHOLOGY OF THE EXTENDED AREA OF PREKONOŠKA CAVE AND GOLEMA DUPKA

Prekonoška Cave is located within the territory of Svrljig Municipality, along with another cave, Golema Dupka (at a distance of some 20 m). Both are situated in the western part of the Svrljig Mountains, above the Village of Prekonoga (Fig. 5). The entrance to the cave is at an absolute altitude of 680 m, above the Dobra River. Their exact locations are:

Geographical coordinates	Latitude N	Longitude E	
Prekonoška Cave*	43° 22' 48"	22° 06' 27"	
Golema Dupka*	43° 22' 47"	22° 06' 29"	
Gauss-Kruger coordinates	X	Y	Z
Prekonoška Cave*	4804575	7589725	680
Golema Dupka*	4804550	7589775	670

*According to the Nature Conservation Institute of Serbia

The cave entrances are located on the left side of a gorge, some 120 m above the channel of the Dobra River, which changes its name to the Prekonoga River (Figure 2) downstream from the caves. Major karst features, apart from the gorge, include a large number of sinkholes. Beginning at the end of the Village of Prekonoga, on the right-hand side of the trail, there is a wetland called Superova Bara, where these surface karst features are readily recognizable (Figure 5 and 6). Jovan Cvijić described the sinkholes and noted that: "...On the hill where Prekonoška Cave is located, there are

rock sinkholes arranged in series, which constitute the “slopes”. One such series is called Bosag Sinkholes, and one of the sinkholes is Duboka Vrtača (Eng. Deep Sinkhole). The slopes extend in different directions and none of them lies immediately above the cave. However, some of them are connected to the end of Prekonoška Cave...”¹

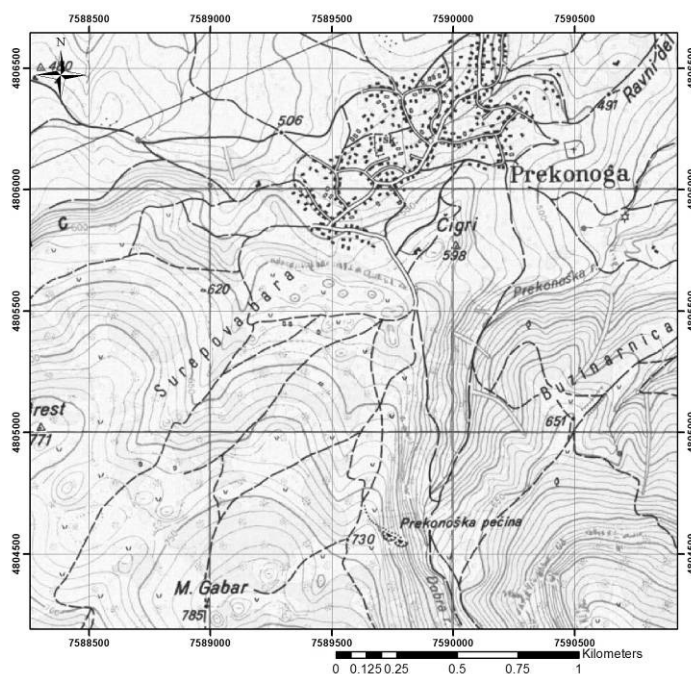


Fig. 5. Locations of Prekonoška Cave and Golema Dupka on topographic map

PREKONOŠKA CAVE THROUGH THE EYES OF JOVAN CVIJIĆ

Prekonoška Cave is a subsurface karst feature, which comprises a relatively simple, sinuous, horizontal-to-subhorizontal conduit. The latter part of the conduit is ramified, with cave chambers rich in natural ornamentation (speleothems). The importance of this cave stems from the fact that it was the first cave in Serbia to be explored – by none other than Jovan Cvijić. Cvijić began his exploration back in 1888 and reported his findings in the *Geological Annals of the Balkan Peninsula* in 1891, in a paper titled “Pre-

¹ Cvijić (1895). *Caves and underground hydrography in Eastern Serbia (Pećine i podzemna hidrografija u istočnoj Srbiji)*, p. 65.



Fig. 4. Entrance to Golema Dupka (ph. by B. Vakanjac)



Fig. 6. Sinkholes along the trail from the Village of Prekonoga to the caves (by V. Ristić Vakanjac)



konoška Cave". One of the outcomes of his exploration was the first schematic representation of a cave in Serbia (Figure 7). Cvijić described the origin of the cave and its morphology, provided a detailed account of its speleothems, noted the conduit dimensions, etc. Cvijić associates the origin of Prekonoška Cave with the evolution of the valley of the Prekonoga River which, according to him, flowed adjacent to the cave conduits. Later, as the base level of erosion shifted downward, the cave conduits were left dry. Today, this river (now called the Dobra) flows some 120 m below, at an elevation of about 580 m above sea level. Above the entrance to the cave, there is a limestone cut-off that is about 20 m high.

СКИЦА 5.

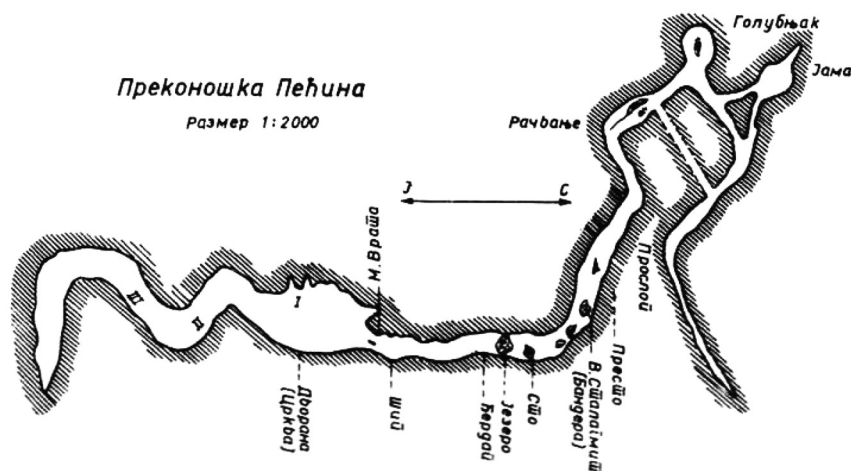


Fig. 7. Cross-section of Prekonoška Cave (Cvijić, 1891)

After the exploration conducted by Cvijić, who detected and investigated a total of 400 m of the cave's conduits (Figure 7), only an additional 35 m of conduits have been explored, such that today the total explored length of the conduits is 435 m (Figure 8) (Đurović, 1998). This demonstrates the level of detail of Cvijić's exploration, undertaken more than 125 years ago. It should be kept in mind that at the time Cvijić explored Prekonoška Cave, everything was done with lamps and there were no modern measurement and recording methods. Currently available data can only largely corroborate the findings from 125 years ago. In this regard, following is an account of the results of Cvijić's exploration. First, there are two distinct parts of Prekonoška Cave: one from the entrance to Mala Vrata (Eng. "Small Door"), and the other from Mala Vrata to the end of the explored corridors.

In the first part, the bottom of the cave is largely covered with a layer of clay, sandy clay, mud, and, in parts, river pebbles (corroborating the assumption that the origin of the cave conduits, according to Cvijić, “must have involved running water”). There are stalactites hanging from the roof of the cave; they are generally short and bulbous or cylindrical (Figure 9). The stalagmites are mostly columnar and with a thick or thin calc tufa crust (Figure 10).

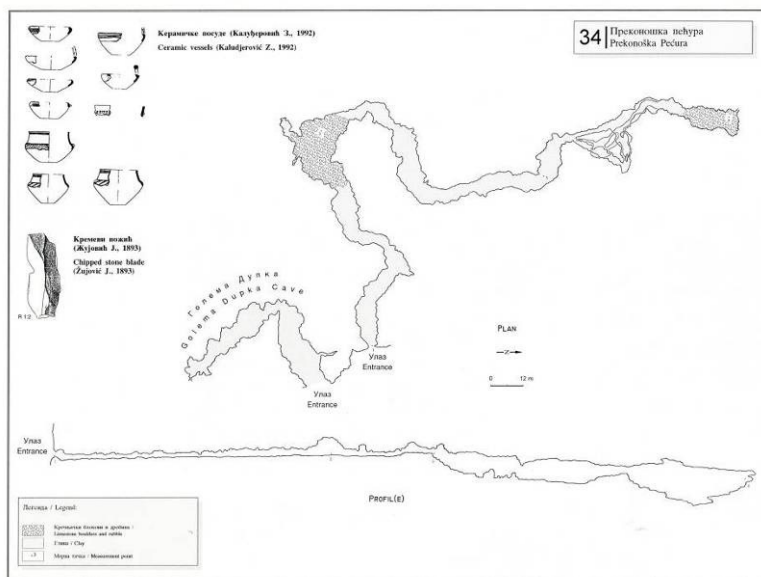


Fig. 8. Plan view and cross-section of Prekonoška Cave (Đurović, 1998)

Contrary to the first part of the cave, where there is only one conduit, in the second part the primary conduit branches out into several secondary conduits, intertwined at various levels.. Cvijić states that the ground is “covered either with a layer of calc tufa or terra rossa, coming from weathered limestone or the ground surface, through fractures”². He then provides an analysis of the origin of the terra rossa, as well as of the water that is present during the wet period of the year. He notes that “water from sink-holes on the ground surface flows through them, as evidenced by heaps of red mud and water at the end of the conduits; when the water from the surface is infiltrated through the fractures, it spreads along the sides of the cave and builds mossy and clustered stalactites covered with terra rossa. On the roof, in places, there are groups of stalactites hanging in bunches, which are all suffused with terra rossa. They undoubtedly mark the end of

2 Cvijić (1895). Caves and underground hydrography in Eastern Serbia (Pećine i podzemna hidrografija u istočnoj Srbiji), p. 67



Fig. 9. *Cylindrical stalactites* (ph. Milorad Kličković)



Fig. 10. *Stalagmites* (ph. Milorad Kličković)

the sinkhole drainage conduit. However, apart from such places, where the sinkholes communicate with the cave, there is water dripping or leaking from numerous fractures in the cave's roof."³ All this clearly indicates, as Cvijić says, that the intertwined conduits in the second part of Prekonoška Cave were formed "solely under the influence of water, which leaks from the ground surface through fractures and dissolves the limestone ...".

In the second part of Prekonoška Cave, apart from the bulbous and cylindrical stalactites which are also found in the first part, Cvijić identifies:

White, yellowish and reddish lathy stalactites, where those with blocked openings have a cluster-like surface covered with terra rossa. They are associated with fractures in the cave's roof.

Mossy and clustered stalactites similar to corals, as a rule covered with terra rossa on the outside, and white and crystalline on the inside. They are found on the walls of the cave's conduits, in places where water leaks and flows down.

Calcite draperies and curtains of different shapes, the most important found near Stol (Figure 7).

With regard to the stalagmites, Cvijić analyzes all the registered forms, names them, and provides dimensions and a detailed description. He states that there are those that are "thin, crystalline, which occur in groups as stalagmites at Šib (Figure 11) ... Rarer are stalagmites resembling a molehill or beehive; among the latter, there is one at Jezero, which is 2.3 m high and 1 m thick. There is another, which I have named Presto, which is 4.3 m thick at the bottom, 2.5 m in the middle and the thinnest (about 2 m) at the top and dented. The least frequent are large, columnar stalagmites, among which the one at Đerdap is 5.5 m high and 3.5 m thick."⁴

Apart from the stalactites and stalagmites, there are rimstone pools in Prekonoška Cave which Cvijić calls calc tufa tubs and emphasizes that they always occur in groups (Figure 12). They are mostly found near Presto and at Šib. He states that "calc tufa arches, which frame and build the tubs, have a convex part facing the inside, and a concave outside. The bottom is also covered with calc tufa, and on top of it there are round, smooth concretions of calc tufa or cave pearls; ..."⁵

3 Ibid.

4 Cvijić (1895). *Caves and underground hydrography in Eastern Serbia (Pećine i podzemna hidrografija u istočnoj Srbiji)*, p. 69

5 Ibid.

In addition, Cvijić provides a detailed analysis and describes the origin of depressions in the second part of the cave. He believed them to be subterranean sinkholes, whose origin is similar to that of the surface sinkholes. He mentions that Jezero in the second part of the cave is shaped like a sinkhole, with a circular contour, 8 m long and 7 m wide. "From the bottom to a height of 0.5 m it is represented by granular calc tufa, white as snow, above which there is ordinary blue limestone covered with either terra rossa or yellow calcite"⁶. He adds that there is no clear boundary between the two and that the height of the white granular calc tufa is the height reached by the water from Jezero. In addition to Jezero, there are other ruts/depressions, whose shape is generally elliptical.

All of this that Cvijić reported is almost impossible to see today. The cave has remained enveloped in darkness to the present day, hiding its splendor. It is only accessible to well-equipped speleologists, to check Cvijić's findings and enjoy the hidden beauty of the cave.

PREKONOŠKA CAVE FROM CVIJIĆ'S TIME TO THE PRESENT

Because it is rich in speleothems, in the then Kingdom of Serbs, Croats and Slovenes the cave was guarded by the Serbian Gendarmerie (<http://www.safari.rs>). It is also the first cave in Serbia where activities were initiated to prepare the cave for tourist visits.

Only traces of these activities are present in Prekonoška Cave today. Outside, there is a steep footpath, slightly overgrown with vegetation, with a handrail that is still in good condition (Fig. 2). There is also a metal gate, which has been vandalized (Fig. 3). Inside the cave there are remnants of a footpath, electrical distribution cabinets and metal stairs (Figs. 13 and 14). It is believed that preparatory activities began in 1963 but were never completed for unknown reasons. This first attempt to prepare a cave in Serbia for tourist visits was, therefore, unsuccessful (Kličković, 2010).

One advantage of this cave is its wealth of dense natural ornamentation, while another is its location, which makes it accessible for large-scale tourism (proximity to a town and a good road). It is also possible to explore the cave and its environs further, and it is therefore of interest to speleologists, geologists, hydrogeologists, and geomorphologists, but also to paleontologists (remains of a rabbit, wood mouse, cave bear, cave lion and ibex have been discovered), biologists (the cave is a habitat for



Fig. 11. *Stalagmites in Šib (Prekonoška Cave), Cvijić, 1895, Fig. 6*



Fig. 12. *Rimstone pools around stalagmites (by Milorad Kličković)*

6 Cvijić (1895). *Caves and underground hydrography in Eastern Serbia (Pećine i podzemna hidrografija u istočnoj Srbiji)*, p. 68

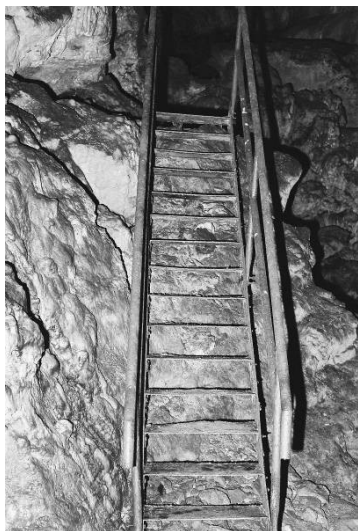


Fig. 13. Remnants of preparatory activities: metal stairs (by M. Kličković)



Fig. 14. Remains of a power distribution cabinet (ph. by M. Kličković)

the blind beetle and centipede), and archeologists (a Paleolithic artifact has been found in a layer of clay under a travertine crust) (Đurović, 1998).

In 2014, an initiative was launched to prepare the cave for tourism but it was purely local. All further activities are in the hands of the entity entrusted to manage the cave.

STATUS OF PREKONOŠKA CAVE

At present, there are about 40 protected speleological features in Serbia. The first (a total of seven) were designated as protected sites soon after the end of World War II (on 11 April 1949). Of the seven, the first three are Prekonoška Cave and two other caves in its proximity: Ravna Cave and Ponor Propast near the Village of Prekonoga (Kličković, 2005, 2007). The other four caves: Radoševa, Velika Atula, Velika Pećina in the Village of Duboka and Lazar's (Zlot) Cave were designated as protected sites somewhat later.

Pursuant to the 1991 Environmental Protection Law, the Nature Conservation Institute of Serbia initiated a review of natural heritage sites, including caves (Kličković, 2005, 2007). In general, the review was largely an evaluation of the natural heritage site in question, within the group of same or similar sites. This included a walk-over survey, some exploration of the site and its environs, and a resulting report (or conservation study).

Such a study includes basic information about the speleological feature, its description and the results of past and recent exploration. Based on the evaluation, the study classifies the natural heritage site which, according to the above-mentioned law, can be: Category I – natural heritage site of exceptional importance; Category II – natural heritage site of great importance; and Category III – natural heritage site of importance (Kličković, 2005, 2007). The study also proposes first, second or third-degree protection, which relates to restricted and allowed activities in the protected area.

Following the review, a new document was issued in 2005: Decision on the Conservation of the Nature Monument Prekonoška Cave (on 31 August 2005), designating Prekonoška Cave as a protected nature monument under Category II – natural heritage site of great importance. The size of the protected area is 15.28 hectares and second-degree protection applies (Group of Authors, 2005). Svrljig Municipality became the manager (warden at the time). After the relevant ministry issued instructions and recommendations in 2014, that state (and local) administration should not manage natural heritage sites, this duty is now in the process of being re-assigned.

CONCLUSION

Prekonoška Cave, along with a nearby cave called Golema Dupka, is located some 1.5 km south of the Village of Prekonoga (Svrljig Municipality). Even though from a current perspective it cannot be classified as one of the largest or richest caves in Serbia, the diversity of speleothems hidden in this cave in a relatively small space, as well as its proximity to a town and the fact that it can be accessed via regional and local roads, make this cave interesting to both speleologists and tourists. All of these reasons had certainly influenced Jovan Cvijić, who began his speleological exploration back at the end of the 19th century in this very cave. He published his findings in 1891 in the *Geological Annals of the Balkan Peninsula*, in a paper titled "Prekonoška Cave". He also produced a schematic representation of the cave, the first such document in Serbia. Further, this cave is the first cave to be protected in Serbia soon after the end of World War II (in April 1949). Another important fact that highlights the importance of the cave is that it was the first in Serbia where preparatory activities for tourist visits had been initiated. However, for unknown reasons, this attempt did not end successfully. Since then, the cave has remained unsecured, its gate was vandalized, and some of the speleothems broken or removed. A happy circumstance is that the cave was designated in 2005 as a protected nature monument under Category II, meaning that it became a natural heritage site of great importance to which second-degree protection applies. The only outstanding actions are to determine who will be its manager (warden) and design a method and procure the funds needed to, above all, protect the site from further destruction, but also finally prepare the cave for its first tourist visits. The cave definitely deserves it.

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JOVAN CVIJIĆ IN TURKEY: HIS LEGACY AND INFLUENCE

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To the noble memory of Jovan Cvijić

ABSTRACT: The great Serbian geologist, geographer and ethnographer Jovan Cvijić (1865–1927) made two trips to Turkey in 1899 and in 1905 with a view to studying the geomorphology of the Thracian Peninsula and its natural extensions into the Bitynian (Kocaeli) Peninsula east of the Bosphorus and the Trojan (Biga) Peninsula south of the Dardanelles. Cvijić's main interest was the problem of the formation of the famous straits of the Bosphorus and the Dardanelles. He became the first to recognise the Thracian-Bitynian Erosion Surface (= also his Pera Surface) and estimated the timing of its origin as Pliocene and the time of the formation of the two straits as original fluvial valleys during the Pleistocene. He also thought that the north-south valleys traversing the east-west depressions in northwestern Turkey (Susurluk, Sakarya) were antecedent with respect to the troughs. He also noted that Uludağ (Mysian Olympos) was separated from the Bursa Plain by major, north-dipping normal faults.

Cvijić also wrote an article on 2nd April 1906 on a Macedonian depression for the Serbian expatriate journal *Golub*, published in Constantinople. His work on karst has long remained the main guide and inspiration for the Turkish geomorphologists interested in karst features. Cvijić's name is gratefully remembered in the Turkish earth science community and as that community grows and improves in quality, there is little doubt that Cvijić's memory will correspondingly augment in significance in Turkey.

INTRODUCTION

The great Serbian geographer, geologist and ethnographer Jovan Cvijić (1865–1927) made two short trips to what is now Turkey mainly for geological and geomorphological purposes. Despite the short duration of his excursions, he made important observations and proposed hypotheses, some of which still inspire research (Цвијић, 1906a; Cvijić, 1908a).

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Jovan Cvijić came to what is now Turkish territory first in 1899 at the end of his two-year Balkan voyage, staying in Istanbul for a fortnight while waiting for permission from the Sublime Porte to do fieldwork (he calls the permission *buyuruldu*, i.e., “thus decreed” in Turkish). He used this time for making excursions to the surroundings of the city, “mainly in the European part” including the Bosphorus. He obtained his permission and was very grateful to the Ottoman administration not only for the permission, but also for further help he received during his travels in Turkey. After Istanbul, he travelled to Saloniki (*Thessaloniki*) by ship (then still Turkish territory), stopping to visit the coastal towns of Enez (*Енос* in Cvijić¹), Dedeağaç (Дедеагач; now *Άλεξανδρούπολι/Άλεξανδρούπολη* in Greece) and Kavala (Καβάλα, now *Καβάλα* in Greece). During his travels, two gendarmes, in places on foot (*zabtiye*), in other places mounted (*suvari*), accompanied him to protect him against any untoward happening. All of this Cvijić recorded with gratitude, who left Turkey “with only pleasant memories” (Цвијић, 1965, p. 65). For a second time he came in 1905 in the company of the famous American geologist Bailey Willis (1857–1949) by train from Sofia. The two scientists had started on a Danube ship and sailed through the Iron Gates (*Ђергајска Клисура* in Serbian; *Demir Kapı* in Turkish), on which Cvijić was to publish an important geomorphological study later in 1908 (Cvijić, 1908b; after a preliminary paper read to the Geographical Society in Vienna on 28th October 1907). The two travellers left the Danube in Plevna (Плевен) and took the train to Sofia (Софиa) from whence they travelled farther to Constantinople (Istanbul). They visited what Cvijić mentions as “a few interesting points” on the Bosphorus and then took the train to Izmit (*Ismid*; ancient Nicomedia). It seems that they also travelled west by ship to the Dardanelles stopping in Silivri (ancient *Selymbria*) and Rodosto (now *Tekirdağ*). Willis then returned to Vienna, but Cvijić continued his tour with his friend L. Lešjanin² going to Bursa, climbed Uludağ (where he recognised the major normal faults uplifting Uludağ; formerly *Keşiş Dağ* {*Keşiş*}; one of the three classical Olymposes, known as the Mysian³ Olympos) and

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- 1 Cvijić recorded the place names in Turkey presumably as he heard them, because it is unlikely that he could read the Ottoman Arabic script. Even if he could read it, the peculiarities of the Arabic plus the Ottoman orthography would not have allowed him to spell them correctly in Latin letters. Accordingly, I here give the modern names, but always add Cvijić’s spelling in his German precis in parentheses to enable the reader to follow him in his original, if need be.
 - 2 According to my friend, the Serbian geologist and historian of geology Academician Prof. Dr. Vidojko Jovic, this may have been Colonel Lj. Lešjanin (1861–1933), son of the well-known Serbian general Milojko Lešjanin.
 - 3 Cvijić always refers to the Mysian Olympos as the Bithynian Olympos. This is not

visited the surroundings of Lake Iznik (*Iznik*) and Lake Ulubat (also Uluabad or Apolyont; classical *Apollonia*). They then returned to Istanbul, whence Cvijić took the train to Thessaloniki with a view to continuing his studies on the Thessalian Olympos. I cannot tell how long Cvijić stayed around the Sea of Marmara, but it cannot have been more than a month, perhaps less. In this short amount of time, he made remarkable observations and proposed explanations for the origin of the landforms, many of which endure and challenge researchers to our own day.

CVIJIĆ'S LITERATURE SURVEY OF THE AREAS HE INTENDED TO VISIT

Cvijić crammed his Turkish studies into the last part of his book *Grundlinien der Geographie und Geologie von Mazedonien und Altserbien nebst Beobachtungen in Thrazien, Thessalien, Epirus und Nordalbanien* (Cvijić, 1908a), between pp. 369 and 392. The photographic plates 17 to 21 accompany his descriptions⁴.

Cvijić started the Turkish part of his book, chapter V, entitled "Der Bosphorus und die Dardanellen" (p. 369) with a page-and-a-half synopsis of the geography of the Thracian Peninsula, the Bosphorus and the Dardanelles ("Geographische Übersicht" in which he also presented a small, 1:400,000 geological map (Fig. 1), revised on the basis of the one published first by Tchihatcheff (1864, Fig. 2 herein; Cvijić used the unchanged third edition of this book published in 1877). During his revision, Cvijić added his observations of dip and strike of beds, the lie of the valley floors and the location of the rock terraces along the Bosphorus (Fig. 1). The observations and interpretations on the geology of Istanbul naturally have improved immensely since Cvijić's visit, but, surprisingly, not those on the geomorphology of the city. It is particularly in the geomorphology of Istanbul that his ideas are still influential. In the same introduction, we

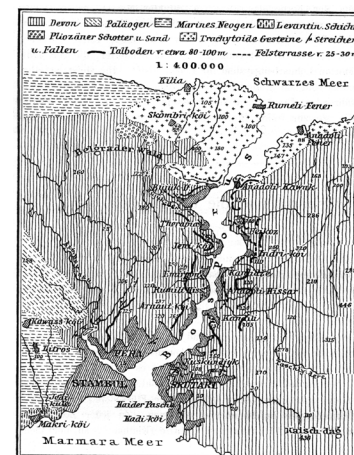


Fig. 20. Geologische Übersichtskarte des Bosphorus.

Fig. 1. Cvijić's geological map of Istanbul, based on Tchihatcheff's earlier map. From Cvijić (1908a, fig. 39). Translation of the legend: Paläogen: Palaeogene, marine Neogene: marine Neogene, levantine. Schichten: Levantine beds, pliozäner Schotter und Sand: Pliocene gravels and sand, trachytoide Gesteine: trachyte rocks, streichen u. Fallen: strike and dip, Talboden v. etwa 80–100 m: valley floor of about 80–100 m elevation, Felsterasse v. 25–30 m: rock terrace of 25–30 m. Cvijić's caption reads: "Geological overview map of the Bosphorus"

wrong, but the more frequent reference to this famous mountain is as Mysian Olympos. The reason for the double appellation is that it lies on the border between the two ancient provinces.

4 This book is actually a shortened version of his larger work published in Serbian by the Serbian Royal Academy in Belgrade in 1906. That larger work has two atlases associated with it and many more figures in the text than in the German version. Anybody interested in the details of the ideas of Cvijić on the areas he discusses in this book, must consult the Serbian version. It is impossible to consider that major classic in the framework of the place available to me here. I thus confine my citations to the German precis.



Fig. 2. The part of Prince Tchihatcheff's geological map of Istanbul that corresponds to Cvijić's map. His legend is as follows: Pink (E): Roches eruptives: volcanic rocks, Greyish blue (D): Terrain Paléozoïque, Dévonien: Palaeozoic terrain, Devonian, Buff (no letter identification): Terrain Quaternaire, Diluvium-Alluvium: Quaternary terrain, Diluvium-Alluvium, Blue (N, in the extreme west of the map): Nummulitique: Nummulitic; yellow (M.I.): Miocène lacustre: lacustrine Miocene

learn that the German (later Austrian citizen) geologist Ferdinand Ritter von Hochstetter (1829–1884) made the designation “Forest of Belgrade” (*Belgrade Ormanı* in Turkish) known to the scientific world in the first part of his 1870 paper (p. 372) and that this designation comes from the eponymous village founded by the people brought here from Belgrade by Sultan Süleyman I (1494–1566; reigned from 1520–1566) in 1521 (Cvijić, on his p. 371 simply says “Turks brought from Belgrade” without mentioning either the date or the Sultan).

Cvijić begins with a thorough survey of the literature and first mentions the Russian naturalist Prince Peter de Tchihatcheff's (1808–1890) publications. It is surprising that he mentions neither Ami Boué's 1840 book, nor de Verneuil's (1805–1873) 1837 paper containing the second, albeit extremely rudimentary, geological map of the both sides of the Bosphorus, nor indeed Edwin Strickland's fossil discoveries establishing the presence of the “Silurian” (in its pre-Lapworthian sense, i.e., including the Ordovician) in Istanbul (Strickland, 1840). Boué's book (1840a-e), when published, lacked an atlas and Cvijić may have been unaware of the fact that a manuscript atlas of this great book was present in the library of Imperial Geological Survey (*k. und k. geologische Reichsanstalt*) in Vienna (see Geier and Wagener, 2006, 567–572). A German translation of the book in two volumes, published under the auspices of Eduard Suess, also has no maps (Boué, 1889). Had Cvijić known of the manuscript atlas, I find it improbable that he would not have mentioned it, because it also contains very valuable ethnographic information about the Balkan peninsula, in which Cvijić was also interested, in addition to the first geological map of the whole of the Thracian peninsula (Fig. 3).

Following Tchihatcheff, Cvijić considers the entire Palaeozoic of Istanbul as belonging to the Devonian, but he is aware that not only Lower (according to de Verneuil), but also Middle and Upper Devonian (according to Ferdinand Roemer, 1863) are present. He also knows that d'Archiac and de Verneuil later also reported Upper Silurian fossils from along the shores of the Bosphorus (d'Archiac & de Verneuil, 1867). He reports that Tchihatcheff had considered the volcanic rocks on both sides of the northern part of the Bosphorus as dolerite, basalt, trachyte⁵ and diorite, but adds

5 Here Cvijić here does not mention the fact that the term trachyte changed its meaning during the nineteenth century and some trachytes became andesites: By trachyte Tchihatcheff here probably meant the andesites. As Harry Rosenbusch (1836–1914) (1898, p. 288, footnote 1) pointed out, that the term andesite was first invented by Leopold von Buch (1836, p. 190, [1885], p. 308; von Buch had read his paper before the Academy of Sciences in Berlin on 26th March 1835: see von Humboldt, 1858, p. 633), in order to separate the albite-containing varieties of the trachyte family of



◀ Fig. 3. Ami Boué's unpublished geological map of the Balkans (courtesy of the Geologische Bundesanstalt, Wien). The coloured legend hardly needs a translation

that later von Adrian (1870a, b) mentioned that they are green trachytes, andesites, rhyolites and their tuffs). Cvijić's report of Tchihatcheff's and von Hochstetter's studies of the Tertiary deposits west of Istanbul are naturally more detailed as they are closer to his interests as a geographer. He reminds his readers that the Russian Prince had recognised the Eocene and the Neogene west of Istanbul and within the Neogene he was able

his time from the sanidine-containing ones. Von Buch himself never used the term again (von Humboldt, 1858, 636) and later the term was dropped in favour of trachyte alone, because the definition, von Humboldt wrote, should have specified not albite with hornblende, but oligoclase with augite. In 1861 Justus Roth reintroduced it for the younger volcanic rocks, in which oligoclase-amphibole or oligoclase-augite were dominant (Roth, 1861, XLV, footnote 1) in order not to stretch the meaning of trachyte too far. However, as is common in geology, the term trachyte continued long after Roth's redefinition of andesite to be used for rocks which we today would call andesite and even rhyolite (Tchihatcheff probably continued using trachyte in its older sense). In some cases, the reverse happened too: Tyrell (1921) pointed out, for example, that Daly's (1914) computations of the average composition of andesite were such that they would even include rocks called trachyte today! Von Humboldt's (1858) long and detailed endnote 85 on his pp. 633–636 gives an excellent summary of the fortunes of the term andesite until 1858, just three years before Roth finally resurrected it.

to distinguish marine and lacustrine sedimentary rocks. Von Hochstetter (1870) later gave a more detailed account, which Cvijić summarises as follows: 1. Eocene (limestones with Nummulites, coral limestones and clayey-calcareous beds), 2. Miocene (the coast of the Sea of Marmara consists of it, namely around Istanbul, Silivri, Tekirdağ {*Rodosto*}; near Bakırköy {*Makriköi*; in his fig. 42 also spelled as *Makrikej*}, some 20 km west of Istanbul, now incorporated into the city], Yalos [*Vados*: no longer existing village near Kâmiloba at 28°26' E, 41° 03' N] and Küçükçekmece {*Kučuk Čekmedže*} there are Sarmatian marine limestones (i.e., Paratethyan in modern terminology) bearing *Maetra* and *Ervilia*. Lower stages of the Miocene do not exist. The marine beds are followed by freshwater deposits with *Melanopsis*, *Neritina*, *Paludina*, *Planorbis* and *Helix*, which von Hochstetter distinguished as the Levantine Stage from the Sarmatian (now they are considered Bessarabian, i.e. Pannonian). 3. The highest beds consisting of gravels and sands and known as the Balgrade Forest Gravels (*Belgrad Ormanı Çakılları*) von Hochstetter considered as belonging to the Thracian Stage equivalent to the Upper Miocene Belvedere (=Arsenal) terrace gravels of the Vienna Basin (the Belvedere gravels are now considered to be Quaternary, because the Upper Miocene fossils found in them are all reworked from the underlying *Congerischichten*, which neither von Hochstetter nor Cvijić could know; from their local relationships, I believe the Balgrade Forest Gravels must also be Quaternary). Cvijić then refers to Nikolai Ivanovich Andrusov's (1861–1924) great monograph on the Neogene deposits of southern Russia (Андрусовъ, 1897⁶) and points out that on his Plate I Andrusov indicated that the Sarmatian Sea invaded much of the western and southern parts of the European part of Istanbul (Fig. 4).

After having exhausted the literature on the surroundings of Istanbul, Cvijić moves on to the literature on the Dardanelles and the surroundings of the Sea of Marmara and mentions Captain Thomas Spratt's (1811–1888; later Vice-Admiral) paper as the first on these areas (Spratt 1857): Spratt had found on the Asian side of the Dardanelles a large area of Neogene freshwater deposits. He correlated these with the similar deposits near Tekirdağ and to the west of Istanbul. Having found correlative sedimentary rocks in Euboea, Samos, and along the shore in Thessaloniki and seen that they enter the Sea of Marmara on both sides of the Dardanelles and also into the Ergene Basin, Spratt deduced the exist-

6 The monograph was published in St. Petersburg in German. I have access only to its Russian version published in the first volume of Andrusov's *Selected Works*. The reference at the end of my paper is to the translation given in that volume. Fig. 4 was reproduced also from that volume.

ence of a large “oriental” or “Levantine” lake in the northern Aegean. Von Hochstetter agreed with Spratt and said that the Miocene sediments of the Mediterranean Stage (i.e., the fully marine Mediterranean Miocene: see Suess, 1885, pp. 389ff.) are absent south of the Balkans (he meant those of Aquitanian, Burdigalian, Langhian, Serravallian and the Tortonian stages) and that the Sarmatian Sea (then considered brackish, but now known to be fully marine: see Piller & Harzhauser, 2005) did not extend beyond the Sea of Marmara southwards, an interpretation Cvijić quotes in full (his p. 372). Cvijić then cites Theodor Fuch’s (1842–1925) discovery of freshwater deposits containing the freshwater snail *Melanopsis* west of Istanbul (Hoernes, 1875⁷). From this paper, Cvijić must have also learnt the presence of sands and tuffs cropping out from beneath the Sarmatian limestones with *Maetra podolica* EICHWALD near Troy.

Encouraged by Fuchs’ discovery and his earlier excursion to the island of Samothrace and to the surroundings of Troy, Hoernes summarised the knowledge of the freshwater deposits that immediately underlie the Sarmatian deposits around the Sea of Marmara (Hoernes, 1876). Cvijić cited the main fossils found and the fact that these deposits resemble those found near Miočić and Ribarić along the Dalmatian coast.

The study by the self-styled “acting British Consul” Frank Calvert (of Trojan fame! 1828–1908) and Melchior Neumayr (1845–1890) (Calvert & Neumayr, 1880) gave occasion to Cvijić to review the Miocene stratigraphy of the Dardanelles: at the bottom the second Mediterranean Stage (Cvijić, following Calvert and Neumayr, p. 363, added Tortonian in parentheses) followed by Sarmatian deposits with *Maetra*. These are overlain by some 12 metres of Quaternary deposits consisting of well-cemented gravel, sand and coquina conglomerates.

Cvijić next cites N. I. Andrusov’s observations around Gallipoli, where the great Russian geologist had found limestones and conglomerates with *Dreissensia polymorpha*, *Dreissensia chaudae*, *Cardium crassum*, *Cardium caezecae*, *Cardium chaudae* and correlated these with the Pliocene fauna of the Caspian. Then Cvijić quotes the report of Andrusov’s very-little known expedition with His Majesty the Sultan’s ship *Selânik* into the Sea of Marmara in 1894. Because he does not give a full citation of this very rare book, I here cite it in full (Андрусовъ, 1896). In it Andrusov had reported the discovery of *Dreissensia rostriformis* on the bottom of the Sea of Mar-

7 Cvijić correctly ascribes the discovery to Fuchs, but fails to mention that what he cites is an abstract by Rudolf Hoernes, in which Fuchs’ discovery is mentioned. His citation awakens the incorrect impression that he is citing a paper by Fuchs. What Fuchs found was *Melanopsis costata* FÉRUSSAC (Hoernes, 1875, 174).

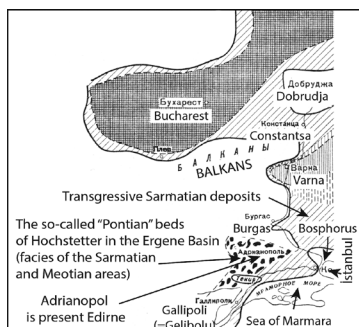


Fig. 4. A part of Andrusov's map showing the extent of the sarmatian Sea of Suess

mara and remembered that the same form occurs also on the bottom of the Black Sea. The conclusion was inevitable that the two seas had been in communication with one another during the Pliocene and not with the world ocean. The Bosphorus was the strait that connected the two, from the bottom of which Caspian mussels had been collected! This remarkable observation had long been forgotten until I pointed out that the Bosphorus Valley must have Neogene deposits at its bottom (Şengör, 2011).

The final publications Cvijić summarises are those of English (1902, 1904) and Franz Toula (1896, 1897, 1898, a, b, c). English provided him with welcome sea-level observations: The Sarmatian strandline was 210 m higher than that of today, whereas the Pontian-Caspian Sea had a strandline only 40 m higher than that today. English also mentioned numerous shell-bed-covered strandlines along the Dardanelles. Finally, English also found red clays with striated pebbles which reach heights of some 300 m.

Toula had made a geological tour around the Sea of Marmara; in the south-western part of the lands surrounding the sea he found metamorphic rocks, diorite and amphibolite schists and serpentinite. He collected many Devonian fossils later determined by Emanuel Kayser (Cvijić wrote Kaiser) who pronounced them to be the equivalents of those found in the Rhenic Spirifer Sandstone. Near Izmit he discovered the first Triassic rocks ever reported from Turkey. They reach from the Lower to the Upper Triassic. Between Darıca and Eski Hisar along the northern coastline of the entrance to the Gulf of Izmit, he encountered the Senonian. On the street between Lapseki (*Lapsaki*; ancient Lampsakos) and Güreçi (*Giredže*) nummulitic Eocene limestones were seen. Near Yapıldak (*Japulđžik*) Toula came across *Conger*ia- and *Dreissensia*-bearing beds, which he ascribed to the Upper Sarmatian and Meotian. Thus, Cvijić concluded, the Meotian beds extended farther to the southwest than supposed by Andrusov.

So what did Cvijić learn about the areas he visited from the literature? Not much. There were only three crude geological maps: one of the Thracian Peninsula and one of Istanbul plus the one by English for the entire frame of the Sea of Marmara (1904, see his plate XXI). No systematic geological survey of the area he planned to visit had yet been attempted and all available observations had been made by foreign travellers. Sea-level fluctuations had been noticed, but studied in only a few places. Palaeontology fared better, because it depended less on areal surveys than geological mapping and could be fairly productive as a result of sampling along single profiles. Almost exactly half a century later than the last study considering the entire surroundings of the Sea of Marmara by Tchihatcheff, Cvijić was to be the first to attempt a new description and interpretation, mainly from a geomorphological viewpoint.

CVIJIĆ'S REVIEW OF THE PREVIOUS HYPOTHESES ON THE ORIGIN OF THE BOSPHORUS AND THE DARDANELLES

Cvijić's main interest in coming to what is now Turkish territory was to clarify the mode of origin of the Dardanelles and the Bosphorus as a final touch in his geomorphological work of the southern Balkan Peninsula. He wrote that four hypotheses stood at his disposal to be tested: 1) that the Black Sea overflowed its boundaries and broke through the Bosphorus, which he credited to Tournefort (1717, 125)⁸ and Buffon (1778, 201–202)⁹. 2) That violent volcanic activity in the northern entrance bore a passage, credited to Dureau de la Malle (1807, 196–197) and Tchihatcheff. 3) Melchior Neumayr's graben hypothesis and, finally, 4) the erosian hypothesis by Alfred Philippson, Andrusov and English.

Cvijić was now out to test these four ideas.

CVIJIĆ'S FIELD WORK IN TURKEY

Cvijić (1908) says that the first things that he noticed as a geomorphologist during his first trip to Thrace and Istanbul in 1899 were a widespread erosion surface in Thrace and the old valley floor along the Bosphorus. Later, during his second trip in 1905, he had the opportunity of visiting both of the straits, the Bosphorus and the Dardanelles, in the company of Bailey Willis "the experienced American physiographer and geologist" and their discussions, Cvijić gratefully recorded, helped to sharpen his ideas considerably on the solution of the problem of their origin. (p. 375). It seems that they concluded that both of the straits were parts of the same fluvial system.

Cvijić noted that the part of Istanbul lying north of the Golden Horn, the Pera (now called Galata and Beyoğlu), sat on a perfectly planed erosion surface with an elevation of some 120–130 m. This "Pera Surface" rose very gently from the shores of the Sea of Marmara in the south northwards to

8 Cvijić seems not to have seen this book and taken the reference from Andrusov (Андрусовъ, 1905) as he himself says (Cvijić, 1908, p. 375, footnote 1). The original article by Andrusov was published in *Земледени*, 1905, volume 5, book 1–2, 1–44. I only have access to the reprint of this article in his *Selected Works*, v. 4, published in 1965. It is that reprint that I cite in the list of references at the end of this paper. P. 118 is what Andrusov quotes (his p. 280) and thus refers to the first page of Tournefort's chapter entitled "Description of the Canal of the Black Sea" in his book. The actual hypothesis Cvijić mentions occurs on Tournefort's p. 125, not 118.

9 Andrusov quotes a 1790 edition of Buffon's *Époques de la Nature*. The first edition of the book containing the *Époques* was entitled *Supplément à l'Histoire Naturelle*, tome cinquième and was published in 1778, which I here quote.

some 220 m near the Black Sea coast in the region of the Belgrade Forest (Cvijić, who had an aneroid barometer with him, presumably during both his visits, noted the highest point to be 223 m) and then descended to the coastline abruptly. He says that this erosion surface continues westward into the Strandja and the Sakar Mountains and also crosses the Bosphorus and appears on the Asian side of the city. There are “lense-shaped elevations” on it forming monadnocks and also upwarps, such as that of the Belgrade Forest, that had formed by bending and not by faulting. This distinction of elevations caused by faulting and those caused by faultless bending Cvijić thought very important in the whole of northwestern Turkey thus becoming a harbinger of the similar ideas of Walther Penck¹⁰ (in Penck, 1918), the son of his doctoral advisor in the University of Vienna, Albrecht Penck, and Hans Stille, the great German master of tectonics (see especially Stille, 1919 and 1924).

Cvijić was able to follow the Pera Surface also in the Dardanelles and pointed out that both of the famous straits were entrenched into it during its uparching. He called this widespread surface the “Thracian-Bithynian Surface” (= *Trakya-Kocaeli Yüzeyi* in Turkish), a concept still in use. Cvijić thought that this surface was younger than the Sarmatian deposits seen around the Sea of Marmara and older than Spratt’s “Levantine Stage” which is then thought equivalent to the early Pliocene.

Cvijić evidently took an excursion to the quartzite hill of Çamlıca (*Čamlidža*), the prominent elevation just to the east of Üsküdar (formerly *Scutari*; ancient *Skoutarion*) (Fig. 5). Around Üsküdar he found the Pera Surface cutting across the Devonian shales and brown bituminous limestones. From Kuzguncuk (*Kuskundžuk*), he climbed up a creek bed to find similar Devonian sedimentary rocks, but farther on, near Burgulu, he came across a quartz conglomerate and then quartzites (now known to be Upper Ordovician-Lower Silurian) which make up the Çamlıca Hill, made popular as a place of excursion for the people of Istanbul by Sultan Mahmud II, who had in vain sought remedy for his tuberculosis in its fresh air. The hill itself rises some 40 to 60 m above the Pera Surface and Cvijić rightly recognised it as a monadnock. The Devonian beds in Üsküdar, he wrote, he saw dipping to the east, which would be incorrect, but in his schematic cross-section (Cvijić’s fig. 40, herein Fig. 6) and in his map (Fig. 1) he correctly drew them to be west-dipping. He did not notice that the Çamlıca was a tectonic klippe and east of Çamlıca he continued drawing westerly

10 Walther Penck (1888–1923) became the first professor ordinarius of geology in 1915 in the then only 15-year-old Darülfünun, i.e. the House of Sciences, the ancestor of the present University of Istanbul.



◀ Fig. 5. Cvijić's photograph of the Çamlıca monadnock taken from the European part of Istanbul. The view is to the east

dips (Fig. 6). In reality, the beds there all dip to the east as he correctly indicated on his map (Fig. 1).

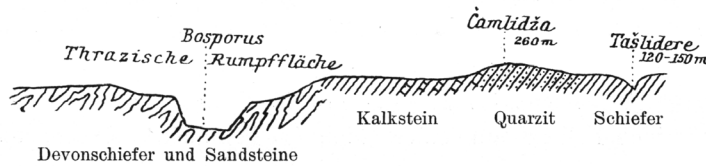


Fig. 6. Cvijić's WNW-ESE cross-section across Istanbul. What he here calls *Devonschiefer* (Devonian shales) and *Sandsteine* (Sandstones) are actually Lower Carboniferous flysch. *Kalkstein* is limestone, *Quarzit* is quartzite and *Schiefer* is shales. The dips he depicts here are correct except east of Çamlıca, where in reality the beds dip to the east. His caption reads: "The erosion surface of Pera and the monadnock of Çamlıca"

East of Çamlıca, Cvijić saw the Pera Surface continuing at an elevation of some 130 to 150 m and dipping, as in the European part of the city, southwards, i.e., towards the Marmara. He noticed that a series of hills continued eastward from the Çamlıca (what he called the "Ayazma {Ajazma} Hills" after their highest point: p. 376¹¹) and all of them consisting of quartzites. Cvijić thought however, that these hills, in contrast to Çamlıca, were *not* monadnocks, but parts of the uparched Pera Surface. It is of some interest here that he did not comment on the fact that on the Asiatic side of the Bosphorus all the major drainage flows northwards in contrast to the drain-

11 This is the Aydos Hill and takes its name from a neighbouring Byzantine fortress that once existed there. I do not know why Cvijić called them Ayazma Hills (*Ayazma*, from the Greek *ἁγίασμα*, a holy place of pilgrimage in the Greek Orthodox faith).

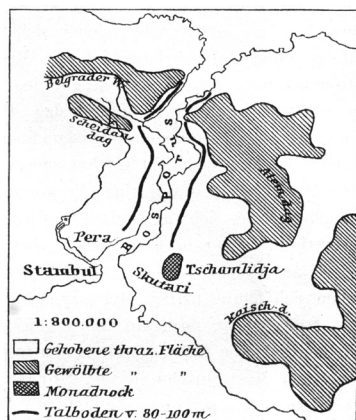


Fig. 46. Die Aufwölbung der thrasisch-bithynischen Rumpffläche.

Fig. 7. Cvijić's map showing the uparching of the Thracian Bithynian erosion surface in Istanbul. In his caption he calls it *penplain* (=Rumpffläche)

age on the European side, which flows southwards. It is not possible that he did not notice it: he in fact drew a map showing the uparching of the Thracian-Bithynian Surface on which one clearly sees that the culmination of the uparching follows the Black Sea coast in the European part and then switches to the Marmara coast in the Asian part (Fig. 7). Cvijić noticed that the elevations east of Çamlıca were much higher (some 200 m higher) and therefore they could not be monadnocks of the Pera surface, unless one assumed that here the Pera Surface had been uplifted considerably more than in the west. He did not like this idea, because he was convinced that the dislocation of the Pera Surface was very recent, reaching into the Pleistocene and its valleys were young. By contrast, the valley remnants between the individual elevations to the east of Çamlıca seemed mature. Cvijić thus concluded that the tops of the Ayazma Hills represented the remnants of an erosion surface older (and therefore now higher) than the Thracian-Bithynian Surface.

Cvijić took another excursion to the Prince's islands (*Prens Adaları* or *Kızıl Adalar*, i.e., "Red Islands" in Turkish, presumably because of the dominant reddish-brownish colour of their soil and the iron ore seen in an old mine in the largest of them) south of the Asian part of Istanbul. He noted that there were four major ones (*Büyükada* {*Prinkipi*}, i.e., Big Island in Turkish; *Heybeli* {*Chalki*}; the Greek name is said to derive from its copper mineralisation; *Heybeli*, i.e., "with saddle bags" in Turkish presumably referring to its two prominent hills separated by a saddle; *Burgaz* {*Antigone*} and *Kınalı* {*Proti*}). Cvijić pointed out that there were five more much smaller islands in their vicinity. It seems that he only visited the Big Island and the Heybeli. The highest point of the former, the 200 m-high St. George, consists of quartzites. The beds strike ENE-WSW and dip to the S with some 15°. Cvijić mentions the old, now abandoned, iron mine. In Heybeli, the rock type is a bluish silicate rock resembling hornstein and its beds strike N-S and dip to the W (Cvijić seems to have come across the hydrothermally altered arkoses of Ordovician age?). Some other beds strike NW-SE and dip with 20° to the SW.

Cvijić noticed that the Pera surface gently sank towards the Big Island so that the sea between them is nowhere deeper than 30 m. The individual hills of the Big Island rise to some 180 to 200 metres above the submerged surface; Cvijić does not say what he considered the islands to be as morphological forms.

A major excursion Cvijić made around Istanbul was the one going from Pera (i.e., around Beyoğlu to Maçka in the present toponymy of Istanbul) to Kilyos (*Kilia*) on the shore of the Black Sea. The only coloured

cross-section he published of the geology of Istanbul was the one he made during this excursion (Fig. 8).



Fig. 8. Cvijić's only coloured cross-section across a part of Istanbul: it goes from the Black Sea coast (Schwarzes Meer) to the Bosphorus. Belgrader Wald is the Belgrad Forest. His legend is: coarse stippling in the north: Diluvial gravels and sands, stippling: alluvium, north dipping lines: quartzite, north-dipping lines with small circles: sandstone and conglomerate, closely spaced, north dipping lines: marls and marly shales, brick symbols: limestones. The cover deposit shown under the Belgrader Wald and one farther to the north are the Belgrad Gravels. Cross-cutting orange rocks with small circles in them are andesite dykes. The cross-section shows that the Thracian-Bithynian erosion surface is older only than the Belgrad Gravels

Along the European shores of the Bosphorus, around the villages of Arnavutköy and Bebek, he observed bluish Devonian shales and bluish, interbedded limestones of the Devonian striking NNE-SSW and dipping with 40° to 50° westward. Farther north, still keeping to the European shore of the Bosphorus, he came across bluish and whitish Devonian shales which had strike directions of WNW-ESE or simply E-W with southerly dips. He later noticed similar directions in the Devonian (now known to be Lower Carboniferous) rocks of the Belgrade Forest and Uskumruköy (*Skombriköi*), where the "eruptive rocks" (now known to be late Cretaceous volcanics) began. Cvijić thought that where the strike and dip of the rocks changed so drastically near Istinye (*Stenja*) two different strike directions met each other. He thought this was significant (the one-time student of Eduard Suess might have thought that here he might have caught the meeting point of two trend-lines, perhaps a syntaxis as he had earlier done in Albania! Cvijić, 1901), although later research showed that the strike directions of the Palaeozoic rocks in the European part of Istanbul are a lot more complicated than Cvijić could then have known. The change in strike directions he reported was only a local phenomenon amidst a greater complexity. Between Yeniköy (*Jeniköi*) and Tarabya (*Therapia*) he reports intensively folded bluish shales and limestones with many calcite veins and small, WNW-ESE striking recumbent or chevron (he says "knee-shaped") folds (he must mean fold axial planes).

After Tarabya, he went into the E-W orientated valley of the Büyük-dere (*Bujukdere*), which, he writes, generally follows the strike. He saw there bluish and blackish shales and sandstones striking NW-SE and dipping to the NE. To the Belgrade Forest these rocks continue and the highest parts of the Forest, e.g. around Kokmuş Pınar (*Kokmuş Bunar*: 200 m), are underlain by reddish shales and limestones. These are important observations, because they allowed him to conclude that the entire ridge of the Belgrade Forest is no monadnock. Farther northward, he reports metamorphic rocks and finally "eruptives." The eruptives begin above Uskumruköy and consist of whitish tuffs. Only in Kilyos, right at the coast, the black volcanics dominate.

Cvijić saw that not only the Palaeozoic rocks, but also the volcanics were truncated by the same erosion surface, the shape of which was thus entirely independent of the underlying rock type. He says, for example, that south of Istinye the strike of the Devonian beds is NNE-SSW, but this direction is not at all visible in the morphology of the erosion surface. The elevation of the Belgrade Forest is also independent of the direction of the old folds and in fact makes an angle with them: it is underlain mainly by Devonian (now known to be Lower Carboniferous) beds with a dominant strike of NW-SE, whereas the ridge it sits on trends E-W. Its eastern part consists of andesites. Although the two parts of the ridge are of different rock types with different resistance to erosion, no morphological saddle separates the two parts.

Cvijić also could see no faults controlling the location of the Belgrade Forest ridge. Thus, "the Belgrade Elevation must be considered an uparching of the old Pera Erosion Surface" (p. 379). Naturally Cvijić could not have any data from the northern shelf of the Thracian Peninsula (none existed until recently), which actually does have normal faults, on the footwall of which the Belgrade Forest high had been elevated.

Cvijić then describes the thick gravel beds containing black silicate shales (!), hornstein and jaspis, now known as the Belgrade Forest Gravels (*Belgrad Ormanı Çakılları* in Turkish). They are yellowish to reddish. He says that von Hochstetter had found marls in them. Cvijić sees them as indisputable fluvial deposits. He again refers to von Hochstetter who reported similar deposits between Kilyos and Karaburun along the Black sea coast. Tchihatcheff, he says, had also noticed them, but thought them in-situ disintegration products of the underlying "Devonian." The Russian Prince also reported "enormous accumulations of yellowish sands full of calcareous blocks" between Beykoz and Sultaniye on the northern part of the Asian flank of the Bosphorus.

Cvijić summarised the main results of this excursion as follows: the entire old Pera Surface, even in its highest parts, carries considerable masses of fluvial sands and gravels. They are similar to those he had earlier seen in Karaatmaca (*Karatmadža*) in the Bulgarian Strandja. Thus the Thracian surface has the valley floors of old Pliocene rivers which deposited the gravels just mentioned. This erosion surface (he writes *Rumpffläche*; i.e. peneplain¹²) was uplifted and arched at the end of the Pliocene and the beginning of the Diluvium (i.e., Pleistocene). Then a newer cycle of erosion began and younger valleys entrenched themselves into the uplifted surface. Unfortunately, Cvijić tells us nowhere how he knew the age of the surface except to say that it truncates the Sarmatian deposits and to quote older authors' opinions on the age of the gravels lying on it. I think his estimate was a good one, but to this day, we still do not know the precise age of his Thracian-Bithynian Surface (nobody doubts that it is there and that it is younger than the Sarmatian), except to say that it may even be younger than he thought.

In the Golden Horn and also in its two feeders, the Kâgıthane (*Ćatane*) and the Alibeyköy (*Alibei-su*) rivers Cvijić noticed that these valleys had the structure of valley-in-valley indicating that previous valleys had been reentrenched into their own matured valleys of older age. Cvijić was to see the same structure in the valley of the Bosphorus soon afterwards. He noted that the sides of the Golden Horn were made up of Devonian (now known to be Lower Carboniferous) yellowish, not very fine-grained mica-bearing sandstones and bluish and yellowish shales. Where the Golden Horn ends and the valley of the Kâgıthane begins, the beds strike NE-SW and dip 40° to 50° to the SE. Farther up the valley they strike NNE-SSW and dip to the SW and finally go into a meridional direction. The valley of the Golden Horn is some 300 to 800 m wide and makes a right angle with the strike of the beds and is thus a purely erosional valley.

Von Hochstetter had considered the old Constantinople (Byzantium), the so-called "Historical Peninsula", to be underlain by Tertiary rocks, although, as he confessed, he had not seen a single outcrop. He had concluded that the Golden Horn was localised along a fault that separated the Palaeozoic rocks along its northern shores from those of the Pliocene in the south. Despite the fact that he had seen no outcrops in the Histor-

12 Modern geomorphological research has shown that true peneplains can form only when the world-wide sea-level is rising (> 250 m) and their formation takes many tens, even hundreds, of millions of years (>50 ma; Pitman & Golovchenko, 1991). Therefore Cvijić's preferred term "Rumpffläche" should perhaps now be replaced simply by "surface of erosion".

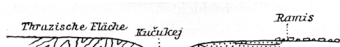


Fig. 41. Die Erosionsfläche bei Ramis.

Fig. 9. Cross-section showing the Thracian Surface and the Sarmatian blocks left behind by the erosion (under Ramis, i.e., Rami). The folded pattern is identified as Devonian (but now known to be Lower Carboniferous). Stippled pattern indicates grey and yellowish mica- and quartz-bearing sands. Above them are "young limestones". The caption reads: "The surface of erosion around Rami"

ical Peninsula, his guess turned out to be largely, but not entirely right: a narrow strip along the Golden Horn and at the Seraglio Point, the present Saray Burnu, turned out to be Palaeozoic. Cvijić concluded, based on his own observations, that the fault postulated by von Hochstetter need not exist and that the Golden Horn owed its existence simply to erosion representing the drowned continuation of the valleys of the Kâğıthane and Alibeyköy as already hypothesised by Alfred Philipsson and Sokolov.

In the neighbouring quarters of Istanbul farther to the west, Devonian (now Lower Carboniferous) beds were present, which were steeply dipping, in places even vertical. Into them the valleys of the stream of Küçükköy (*Kučükköi*) or Otlukdere was excavated, which is a tributary of the Golden Horn. Its upper rim was concordant with that of the Golden Horn. When one walks upstream along the valley of the Otlukdere one reaches the Thracian erosion surface near Rami (*Ramis Çitluk*) a top deformed Devonian (i.e., Lower Carboniferous) shales and grey- and yellowish-coloured quartz-bearing sandstones with barely perceptible dip. Near Metris (*Meteriz-Çitluk*), von Hochstetter described them as Eocene. Above them, up to a height of some 150 m, there were strewn, angular blocks of clayey limestone with *Maetra* and *Ervilia*. Near Kavaz there were larger blocks and locally even in place layers of the same rocks. This showed that much of this region had been covered by Sarmatian beds, which were later stripped by erosion (Figs. 9 and 10). Near Çamurlu Han (*Çamurli-Han*) Cvijić saw the Sarmatian Beds abut against or perhaps even dip below the Devonian (i.e., Lower Carboniferous) rocks; he concluded that here had to be a fault, which interpretation was corroborated by later observers such as Ernst Chaput (1931, 1936, his fig. 17).

Cvijić followed these Tertiary beds all the way to the coast of the Sea of Marmara with dips around 4° to 5°. As they approach it, he noted that they get covered by freshwater deposits in which von Hochstetter had found *Melanopsis*, *Paludina*, *Neritina*, *Planorbis* and *Helix*. All of these rocks appeared truncated by an erosion surface the dip of which agrees only with the top of the Levantine Stage (i.e. Lower Pliocene) sedimentary layers near the Marmara shores. As a result of the uplift of the Pera Surface, younger valleys that he just mentioned had been excavated; above the younger valley floors near Kavazköy (*Kavazköi*) is an older, broader valley, in which the young valley of Çırpıcıköy (*Çirpedžiköy*) had been entrenched.

Having identified and dated the geomorphological elements on both sides of the Bosphorus to his satisfaction, Cvijić now turned his attention to the Bosphorus itself. Along the entire valley of the Bosphorus for some 20 km he recognised without difficulty an upper valley floor or an up-

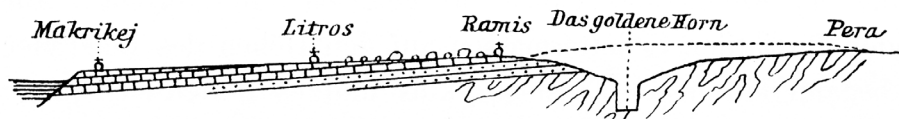


Fig. 10. Cross-section going from Pera (i.e., Beyoglu) to Bakirköy (Makrikej) going across Bagcilar (Litros). The cross-section is ENE-WSW and shows the Thracian erosion surface. The folded pattern is Lower Carboniferous flysch (but which Cvijić was led to believe to be Devonian); stippled beds represent the Eocene claystones, sands and sandstones. The brick pattern is Sarmatian and Levantinian limestones, sands and shales with erosion blocks of freshwater limestones. The caption says "Showing the situation near Bagcilar (Litros)"

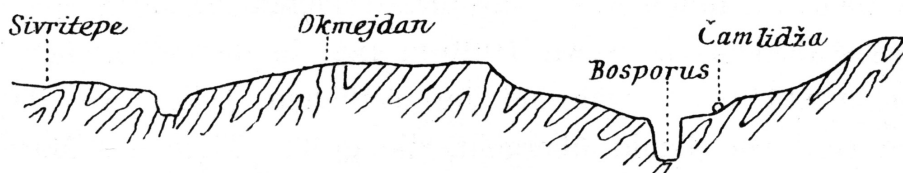


Fig. 11. The old valleys of the Bosphorus around Hisar (which Hisar, i.e. fortress, is meant is unclear) and Čamlıca. Okmejdau is the present Okmeydanı in Istanbul

per terrace cut into the old erosion surface (Figs. 1 and 11). This terrace dips to the southwest when seen from Beykoz (*Beikos*) or Tarabya, thus roughly following the flow direction of the present Bosphorus. According to his estimates and aneroid measurements in a few places, this terrace lies at a height of some 80 to 100 m above the present day sea-level. The broad-floored former valley it represents is two to three times broader than the present Bosphorus. He indicated on his map (herein Fig. 1) where he studied or just saw this upper terrace. Below it is another, more weakly developed, second terrace lying at elevations of some 25-30 m, in places even 40 m above the current sea-level. Cvijić thinks that below this second terrace, there may be still two more, the existence of which the future observations must test (so far, regrettably, nobody undertook such a test). Cvijić thinks that the upper terrace perhaps represents the valley of the Bosphorus cut into the Thracian-Bithynian erosion surface before it was deformed and uparched. It is thus antecedent with respect to the uparching. Through later deformations, this first valley of the Bosphorus became deformed and now lies at various elevations; seen from the heights of Anadolukavağı (*Anadoli-Kavak*), it seems to dip today towards the NNE, i.e., towards the Black Sea.

► Fig. 12. A N-S cross-section across the Bursa plain and the Mysian Olympos (Cvijić calls it Bithynian Olympos; Keşiş Dag, now Uludag), showing the prominent, north-dipping normal faults uplifting the Uludag massif. Kalktuff is calcareous tufa, Festung is citadel, Die Thermen v. Brusa is the thermal baths of Bursa, Bläuliche Krystall. Schiefer mit Marmoreinlagerungen is bluish crystalline schists with marble intercalations, Marmor is marble. The caption reads "Dislocation of the peneplain of the Bithynian Olympos"



By contrast, the southern margin is much more sinuous. Cvijić begins by mentioning the narrow and long Gulf of Izmit (from the city of Izmit, the ancient Nicomedia), the morphology of which continues into an E-W trending, trough-shaped, valley eastward, in which the 16-km-long Lake Sapanca (*Sapandža*) is located. Farther east the E-W trough is truncated by the valley of the Sakarya (ancient Sangarios) River flowing northward and emptying into the Black Sea.

South of the Gulf of Izmit is a saddle followed by the E-W orientated Gulf of Iznik (*Iznik*; now called the Gulf of Gemlik). It too has a trough-shaped easterly prolongation, in which another lake, Lake Iznik sits. That E-W trough is too truncated to the east by the valley of the Sakarya.

Another indentation of the southern coast of the Sea of Marmara is the E-W trending Gulf of Erdek (*Artaki*). Cvijić follows it on land into the E-W trending trough, in which the lakes of Manyas and Apollonia are located; farther east, the city of Bursa (*Brussa*) is also located in it. Cvijić noted that in this valley also a stream coming from the south, the Susurluk River (*Simav Čaj*; ancient Mekestos), cuts right across the valley and its bordering mountains and empties into the Sea of Marmara. He considered all these N-S valleys traversing the E-W troughs and saddles as antecedent rivers with respect to the E-W structures. From the western part of the Bithynian Peninsula (does he mean the Armutlu Peninsula extending into

Having finished his excursions around Istanbul, Cvijić travelled eastward with train and got to see the Gulf of Izmit only from its window. He studied the British Admiralty charts to get an idea of the bathymetry of the Sea of Marmara. He noted the presence of a deep, E-W trending basin the upper edge of which was defined by the -200m isobath. It is much closer to the northern margin than to the southern margin. Cvijić notes that the northern margin of the sea of Marmara has a simple coastline, the only two main indentations being the lagoons (he calls them *limans* using the Russian word for estuary) of Küçük- (*Kučuk*) and Büyükçekmece (*Bujuk Čekmedže*). The maximum depth of the former behind the coastal barrier is 18 m, whereas the latter is only 3 m deep. The E-W trough has no such indentations along its margins and have nearly straight edges.

the Sea of Marmara between the Gulfs of Izmit and Gemlik?) from the Lake of Apollonia up to Adapazarı (*Adabazar*) and Akhisar (*Akhissar*) in the east and the Bithynian Olympos (Uludağ) south of Bursa, an old erosion surface cuts across the multifarious rock types of these regions. Immediately after the deposition of the Levantine Stage (i.e., Lower Pliocene), this surface was deformed in places by bending, in others by faulting. Cvijić was the first to publish the large south-dipping normal faults separating Uludağ from the Bursa Plain (Fig. 12). By contrast, he thought that the mountains north of the Bursa Plain had formed by uparching of the erosion surface. Although we now know that there are many faults to the north of the Bursa Plain, Cvijić was basically right! The mountains north of the Bursa plain had risen as footwall anticlines below large normal faults active along the southern shore of the Sea (see Le Pichon et al., in press). The N-S valleys of the Sakarya and the Susurluk (=Simav) were supposed to be antecedent to all this Pliocene activity.

Recent research has suggested that the E-W troughs are actually older than the medial Pliocene. So did Cvijić get his antecedence story wrong? We still do not know, because the history of the large Anatolian rivers has not yet been worked out in enough of a detail to pronounce a final verdict on Cvijić's interpretation (the most recent estimates are given in Şengör et al., 2005). He is still there challenging us to test his idea.

The final area on which Cvijić related his personal observations is the Strait of the Dardanelles. He said that the sides of the strait consist of freshwater deposits overlain by marine Sarmatian beds. The Sarmatian beds include marls, clays, sands and conglomerates. Under the Sarmatian beds in the Ganos (*Tekfur*) and Koru (*Kuru*) Dag, he saw Palaeogene sandstones and limestones. The beds are rarely horizontal, mostly have gentle dips up to 15°. He noted that the Dardanelles eroded a gentle anticline and excavated its valley into it.

He then followed the valley of the Koca Çay (*Kodža-čaj*) upstream eastward and south-eastward from Çanakkale (*Čanak*). The valley is cut into the mainly white marls of the Sarmatian Stage. On the right side of the Koca Çay (i.e., to the northeast of the valley) a gravel-covered terrace seems to be cut into the valley side with an elevation of some 15-20 m. On the left side he saw, by contrast, two terraces. Above them is a post-Sarmatian erosion surface dipping from the southeast to the northwest right across the Dardanelles. The strait itself and the valley of the Koca Çay were excavated into this surface.

Some 4 to 5 km south of Çanakkale, Cvijić observed volcanics in agreement with earlier observers consisting of conglomerates with large

clasts and breccias (they are now known to be agglomerates), then yellowish tuff and a dense volcanic rock of “trachytic structure”. The volcanics are bedded and dip to the SW. In places they are cut by breaks and on some of these slickensides are seen. Cvijić says that these volcanics were affected by a strong tectonism. The volcanics were eroded after their deposition and the erosion surface cutting them has a stronger dip than that of the Thracian Surface. The almost horizontal Sarmatian beds lie with a sharp unconformity atop the volcanics (Fig. 13). Cvijić concludes from his own observations that the volcanics here are older than the Sarmatian and not of Pliocene age as assumed earlier by Calvert and Neumayr (1880, 369); time proved him right.



Fig. 13. Cross-section across the Strait of the Dardanelles. Thrazische Fläche is Thracian surface. Sarmatische Schichten is Sarmatian beds. The caption reads: “Profile around Çanakkale across the Dardanelles and their surroundings”.

Not only around Çanakkale, but around the whole of the Dardanelles strait Cvijić was able to recognise the old surface of erosion, which he considered equivalent to the Pera Surface, which however had been bent into broad arches and troughs. This surface is some 200 m high around Kilitbahir (*Kilid-Bahr*) and Çanakkale from where it climbs north-northwestward to the northern edge of the Gelibolu (*Gallipoli*) peninsula, where it abruptly subsides beneath the waves of the Gulf of Saros “presumably along a fault-line.” That fault has since been found and mapped (see Şengör et al., 2005). SE of Çanakkale, the erosion surface climbs to some 300 m and truncates both the Sarmatian deposits and the underlying volcanic rocks. The Dardanelles were cut into this surface, on which Cvijić identified monadnocks made up of resistant volcanic rocks. North of the Dardanelles, the monadnocks are rarer and consist of Palaeogene sandstones and limestones. Cvijić thought that the Ganosdağ height might also be a monadnock, but we today know that it sits on a major thrust fault associated with the north Anatolian Fault in the Sea of Marmara and is still being uplifted (Şengör et al., 2014).

Cvijić thought that first a valley of the Dardanelles twice as broad as the present valley had been excavated into the Pera Surface. The present valley of the strait, which Cvijić describes as being “canyon-like”, was then cut into that broader valley, into the gently dipping Sarmatian beds; that is the present-day marine strait. On both sides Cvijić observed landslides forming terrace-like steps, but some he thought might be genuine terraces corresponding to the lower Bosphorus terrace. Around the lagoons of Büyük- and Küçükçekmece Cvijić also noticed ancient valley floors and thought that they probably corresponded to the upper Terrace in the Dardanelles.

Cvijić thus concluded that the Dardanelles presented him with the same history as the Bosphorus. He thought he definitely proved that both were cut into the Pera Surface. Both valleys have terraces dipping to the SW and both cut their present valleys during the deformation of the Pera Surface.

CVIJIĆ'S CONCLUSIONS OF HIS FIELD WORK IN TURKEY

So far Cvijić's personal observations in Turkey. In the next and final chapter of his Turkish studies, numbered five and entitled “the history of evolution of the Bosphorus and the Dardanelles”, Cvijić presents his synthesis and conclusions. The first subheading in this final chapter is the “overview of geological history, the formation and the age of the Thracian erosion surface.” He first repeats mentioning the bending of the trend lines near Istinje and says that the folding of the Devonian beds in Istanbul (which are now known to include all the Palaeozoic stages except the Cambrian) was pre-Permian, which estimate remains correct. But then he says that the land conditions on the Thracian peninsula lasted from the Permian to the Palaeogene; we have since learnt better and know that already in the Anisian the entire Peninsula was probably flooded by the sea. Cvijić says that the sea returned in the Palaeogene, but at that time the transgression had been locally preceded by the deposition of freshwater sediments in Keşan (*Keşan*), Ganosdağ (*Tekfur*) and Korudağ (*Kuru*). This assertion cannot be correct. The only place where the contact between the Palaeogene and the underlying basement is seen is west of Şarköy and there the ophiolitic mélange basement containing HP/LT metamorphic rocks are immediately overlain by a thin horizon of Nummulitic limestones and then a thick section of Eocene flysch (Şentürk & Okay, 1984; Siyako & Huvaz, 2007). I cannot now figure out from where Cvijić got the idea of freshwater deposits below his Palaeogene clastics.

He pointed out that the Palaeogene transgression did not cover the entire Thracian peninsula and that Nummulitic limestones existed along its

margins against the crystalline Strandja basement and the Palaeozoic of Istanbul. Here the First Mediterranean Stage of Suess (from the Aquitanian to Serravallian) is missing (the entire Lower Miocene) and the presence of the Second Mediterranean Stage (Tortonian) had not yet been proven.

Sarmatian exists between Kilyos (*Kilia*) and the Lagoon of Terkos (which Cvijić calls *Liman Terkos*) along the Black Sea coast and all along the northern Marmara coast from Istanbul to Tekirdağ, along the Dardanelles, plus in many neighbouring areas of Asia Minor, especially around Troy, on the islands of Bozcaada (*Tenedos*) and Gökçeada (*Imbros*) and in Kassandra, the westernmost peninsula of Chalkidiki, and in the Basin of Serres in Bulgaria. He speculates that it may also be present below the Thessalian Olympos SW of Katarina. He adds that in other parts of the Macedonian mainland and on the other Aegean islands no Sarmatian deposits had yet been found. Therefore, he postulates a gulf to have extended all the way to Kassandra and to Thessalian Olympos from the Sarmatian areas of southern Russia. Modern research largely agrees with Cvijić (e.g., Paramonova et al., 2004), but perhaps the modern concepts ought to be revised more in the direction of Cvijić's original interpretation in view of the important discovery by Piller and Harzhauser (2005).

At this point Cvijić says something that one would not have expected from a student of Suess: he says that after the Sarmatian, a geosyncline came into being in the northern Aegean region and created the northern part of the Aegean Sea (p. 386). It is well-known that Cvijić's great teacher Eduard Suess (1831–1914) was against the concept of geosynclines. From whom could Cvijić then have got the idea of a geosyncline? Of the three important German-language textbooks of the time, Kayser's *Lehrbuch der Allgemeinen Geologie* (Kayser, 1893), and Uhlig's revision of Neumayr's immensely successful *Erdgeschichte* (Neumayr, 1895) mention the term geosyncline only once and in the context of explanations offered for the formation of very thick sedimentary deposits, whereas Franz Toula's *Lehrbuch der Geologie* (1900) does not even bother to mention it. The French stratigrapher Émile Haug's influential paper on geosynclines and continental areas had been published in 1900 in which he had introduced the idea of deep-water of "European-type" geosynclines. This paper or possibly the fourth edition of de Lapparent's famous text-book *Traité de Géologie* (de Lapparent, 1900), the main text-book of the French-speaking world then, may very well have been Cvijić's inspiration, but I still find his usage surprising, given his teacher Suess' strong (and well-justified, I might add) opposition to that concept.

The presence of Levantine (i.e. Lower Pliocene) sedimentary rocks along the northern margin of the Sea of Marmara tells him that the sea

existed already at that time. He then cites Andrusov's discovery of Chauda Beds (Cvijić thought them Upper Pliocene, but they are now considered lowermost Pleistocene: Sorokin & Babak, 2011) near Gallipoli with fully Caspian characteristics. This to him indicated two possibilities: either the Sea of Marmara was a part of a large "Pontic" basin from the Caspian in the east to the Dardanelles in the west, or Marmara was an independent basin with Caspian characteristics. No Chauda beds were known from the Thracian Peninsula (except in Gallipoli) or in the Bosphorus. Thus, Cvjić concluded that during the Pliocene the Sea of Marmara was an independent brackish lake. The rivers now emptying into the lagoons of Büyük- and Küçükçekmece then emptied into the Sea of Marmara. In the drainage basin of the Meriç (*Marica*) headward erosion had already started during the Pliocene. Observations in the region of the Vardar and the eastern side of the Thessalian Olympus indicated that here also the headward erosion had already commenced in the Pleistocene and Cvjić connected this with the presumed late origin of the northern Aegean. Thus the tectonic events affecting his main erosion surface discovered in Turkey had to have started at the end of the Pliocene.

In the second subheading, entitled "The Pliocene Aegean River," Cvjić pointed out that before the break-up and subsidence of a land coincident with the present-day Aegean Sea (which he thought was sometime in the latest Pliocene-Pleistocene), a river flowed down the eastern edge of this land and emptied into the Mediterranean somewhere near the present-day island of Kos. In Fig. 14, I have given a reconstruction of this river following his interpretations.

The third subheading of his last chapter is "Uplift and uparching of the Thracian-Bitynian penneplain; origin of the young canyon valleys of the Bosphorus and the Dardanelles; temporal coincidence of the uplift and glaciation". Here Cvjić pointed out that the Bosphorus and the Dardanelles are 120-150 m-deep canyon valleys, only the lower parts of which were invaded by the waters of the Mediterranean. Cvjić rightly concluded that these valleys must have had already formed when the waters of the Mediterranean invaded them. He argued that a drop of sea level for 150 m had not happened to form them, but the land was uplifted, in fact the Thracian Peninsula was uparched. The origin of the valleys must have been synchronous with this uplift, which Cvjić dated to have happened between the deposition of the gravels of the Belgrade Forest north of Istanbul and the invasion of the valleys by the waters of the Mediterranean sometime during the late Pliocene or the Pleistocene (now the invasion of Mediterranean is dated to have occurred much later: during the early Holocene: see Şengör, 2011).



Fig. 14. Cvjić's late Pliocene Aegean River drawn by me after his descriptions in Cvjić (1908a)

Cvijić repeatedly said that he imagined the uplift of the Thracian-Bitynian surface as one of uparching. He had noticed drowned valleys in the mouths of the Bulgarian rivers which, when followed upstream exhibited terraces indicating invigorated erosion. Such a situation he also saw in the Bosphorus: where the strait goes into the Black Sea, Cvijić thought he could see it acquire the characteristics of a *liman*, i.e., an estuary. He regarded the Golden Horn a perfect *liman*. But in the middle part of the Bosphorus "where the water reaches its highest speed", the strait had all the characteristics of a valley of erosion. Here he noted the presence of potholes in the bed of the Bosphorus, just as he had done earlier in the bed of the Danube at the Iron Gates. This stretch of the Bosphorus lies within the uparched Thracian erosion surface. The Bosphorus, he thought, must have been submerged not in the beginning of the Diluvium, but somewhat later.

He also noted that the dislocation of the Thracian-Bitynian erosion surface and of the Thessalian Olympos had taken place at the end of the Pliocene and in the beginning of the Diluvium and thus either just preceded or was contemporaneous with the Pleistocene glaciation. This may have caused the highest parts of the Thessalian and the Mysian (he wrote "Minor Asian"¹³) Olympos to rise into the glacial environment.

Cvijić ends this subsection by pointing out that the rise of the erosion surface about the Bosphorus and the Thessalian Olympos were cogenetic with the subsidence of the northern Aegean "to preserve the balance of the earth's crust in this region," thus making a reference to isostasy. But he pointed out that these tectonic events continued and the submergence of the Bosphorus and the Dardanelles constituted the last phase of these events.

In the final subchapter, Cvijić discusses the Recent erosive events along the Bosphorus and the Dardanelles. He repeats that the central part of the Bosphorus is a young valley of fluvial erosion and that erosion continued into the marine phase. The Bosphorus current must have been very strong in the beginning, "a tearing current," which Cvijić rightly said could not be explained simply by the differences in salinity between the Bosphorus and the Mediterranean or by the present-day slopes. He quoted again the reported potholes at the bottom of the Bosphorus (regrettably he does not say where he obtained this information) as evidence of a very rapid current. He says that the tectonic events that changed the surface configuration of the Thracian erosion surface must have had a considerable

13 This is inappropriate, because Asia Minor has two of the three classical Olymposes: the Mysian and the Lycian Olymposes (the latter is now called *Tahtali Dag* in the province of Antalya).

influence on the Bosphorus current. He complains that he did not know of any theoretical studies on this problem of the influence of changing bathymetry on marine currents, but he very prophetically says that we know nothing of the changing basis of erosion for the Bosphorus during its history. He later points out that a substantial sea-level lowering could not be considered, because no such lowering has been recorded from the margins of the world ocean. Cvijić did not think of isolating the Black Sea. Had he done that, he would have anticipated the Black Sea Flood hypothesis almost a century earlier (Ryan & Pitman, 1998; Ryan et al., 2003); but he very perceptively realised that a considerable change in the erosional basis for the Bosphorus seemed inescapable. He struggled to do it by tectonics, but said “the hypothesis of the rejuvenation of the Bosphorus as a consequence of tectonic events that happened after the medial Diluvium, remains, especially theoretically, still unclear” (p. 392).

He cited numerous sources showing the rise of the terraces of the Dardanelles also showing its rejuvenation just like the Bosphorus. He cited Andrusov again, claiming that the floor of the Sea of Marmara had experienced a subsidence during the 1895 earthquake¹⁴, because the bathymetric measurements made in 1872 by the British¹⁵ showed a smaller depth than their own measurements in the same place. This was, for Cvijić, the negative counterpart of the rise of the Thracian-Bithynian surface in the later Diluvium.

CONCLUSIONS

Jovan Cvijić’s two excursions in Turkey was the most detailed geomorphological study at the time of what is northwestern Turkey now. It has long remained as the authority and as I tried to show above, many of his observations and conclusions still stand and/or remain untested. Cvijić appears in his books on his geomorphological studies of Macedonia, Old Serbia, Thrace, Thessaly, Epirus and Northern Albania not only a sharp and unde-

14 This is the 10th July 1894 earthquake that caused considerable damage in Istanbul (Öztin, 1994; Küçükalioglu Özkılıç, 2015, Çalık, undated, but post 2000). Cvijić’s mistake in the date results from the difficulty of converting the Hegira years to AD years, because the former is a lunar calendar, whereas the latter a solar one. For a correct conversion, one must not only know the Hegira year, but also the month and the day. Cvijić may not have had that information, which is hardly surprising.

15 Cvijić gives no reference for this information. I believe he had in mind the Sea of Marmara survey commanded by W. J. L. Wharton on board *HMS Shearwater* in 1872. See the reference no. 925/30162 in the British National Archives.

fatigable observer, but also a bold and very knowledgeable theoretician. He was a true geographer very much in the sense of Alexander von Humboldt. His visits to Turkey has greatly enriched our knowledge of this corner of the world that had not been abundantly provided by brilliant naturalists. Cvijić was not only one of those rare people, but he was one of the greatest.

But his two trips were neither Cvijić's only contact with Turkey, nor the totality of his influence on Turkish geology and geography. In 1906, after his second journey to what is now Turkish territory, he published a short article on the basin of Ovche in Macedonia (then still Ottoman territory) in the journal *Golub* (Голуб=pigeon) published in Istanbul. The journal *Golub* was published by the Serbian foreign surface in those capitals of the countries in which there was a significant Serbian expatriate population. Its purpose was to bring home news to these people and to help them not to forget their Serbian culture. Cvijić's article was short, only two pages, in which he discussed the geographical characteristics of the Ovche Polje (Cvijic 1906b): first its climate: it had cold winters with precipitation and hot, dry summers. Cvijić characterised it as a semi-desert and argued how the climate determined the other geographical characteristics. The area had many vineyards, but apart from that, mainly animal husbandry formed the backbone of its agriculture. Cvijić also described the villages down to the materials used for building houses. I am not aware that this article has ever been cited in the Turkish geographical literature, but must have been read by the then not inconsiderable Serbian expatriate population in Constantinople.

By contrast, his publications on karst geomorphology have long been the main guides for the Turkish geomorphologists, especially for those working on the Taurus karst. The first overall description of the karst features in Turkey is the paper by Alagöz (1944). In its second paragraph he notes: "Cvijić (*Das Karstphänomen*. geog. Abhandlungen. 1893) was the one who first introduced the characteristics of the landforms of calcareous topography to the world of geography". In almost all papers dealing with the Turkish karst, well into the seventies, Cvijić was the main guide and the inspiration. All Turkish geomorphologists are grateful to him.

I learnt about Cvijić already when I was in the first grade of high school in Istanbul, so when I was about fourteen years of age, during my geography classes. He remains unforgotten in the Turkish earth science circles. As Turkish earth sciences improve with time, so will Cvijić's memory grow among its practitioners.

ACKNOWLEDGEMENTS: It was the great Turkish geographer, Professor Sırrı Erinç (1918-2002), an admirer of Jovan Cvijić, who had introduced me to

his works. I am grateful to my friend Academician Professor Vidojko Jović for his invitation to participate in the Cvijić sesquicentennial symposium in Belgrade. It was an immense honour and a great pleasure to be celebrating a man of Cvijić's stature in an environment where some of my own roots lie. Jović was also a great help in informing me about sources, finding them for me and giving me much information I could not have found in published sources. He also kindly translated many of the written sources for me. Without him this paper could not have been written. The officials of the Library of the Serbian Academy of Sciences have rendered me great and friendly help during my visits to Belgrade, where, wherever I went, I was made to feel at home.

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ON VARIETY OF KARST RISKS AND IMPACTS ON CONSTRUCTION, IN THE CONDITIONS OF COVERED KARST

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ABSTRACT: Building of structures and facilities in karst terrains is seriously endangered by various karst features occurring on the ground surface. Professor J. Cvijić was the first to point out the problem in the XIX century. The present paper is devoted to one of possible aspects to be taken into account in karst risk assessment for constructions that are sensitive to various superficial karst phenomena in covered karst territories. The concept of karst risk is understood as the probability of negative impacts of karst features that can cause multi-aspect damage of social, economic and/or environmental character. The social damage is above all associated with probable loss of life. The paper presents a brief discussion of the impacts on constructions from the point of view of karst risk assessment, including potential damage of different types. Some of the superficial karst phenomena are discussed in greater detail, such as probable karst collapses, local subsidences, old sinkholes, differential foundation settlements, slow subsidences, karst (karst-suf-fosion) soil slumps. Several disastrous accidents with constructions of different types are analyzed and corresponding damage is commented on. Special attention is paid to verbal assessment of social damage.

Key words: karst, sinkhole, risk, damage

INTRODUCTION

In many countries worldwide the main hazard for building in karst terrains is usually presented by various karst phenomena occurring on the ground surface or in the foundations of constructions. The issue was first

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investigated in the XIX century by Professor J. Cvijić (1893, 1895), known as the founder of karstology. His contribution is mentioned in numerous publications on the history of karstology. Among the authors there are N.A. Gvozdetsky, G.A. Maximovich (USSR), D. Ford (Canada), P. & J. LaMoreaux (USA), and J. Zötl (Austria). Investigation by Professor J. Cvijić had a considerable influence on karstology in Russia, where an applied trend of karstology originated and successfully developed into “engineering karstology”. Further achievements of Russian engineering karstology in XIX and early XX century were encouraged by large-scale railway construction in karstified terrains of Povolzhje, Urals and Siberia. Works by Russian engineers and geologists published in those years often contain references to the unique investigation by Prof. J. Cvijić. A very similar situation happened in the first half of the XX century in the Soviet Union, when a wide-scale construction of hydraulic facilities was performed. Thus, investigation by J. Cvijić formed backgrounds and enhanced development of engineering karstology in Russia.

Practical experience shows that efficient solution to problems of engineering karstology can exclusively be found by engagement of teams of specialists, which include geographers, geologists and civil engineers with diverse expertise. In certain projects, such as the construction and maintenance of unique objects, it is recommended to perform a baseline study and analyse the situation in cooperation with environmentalists, emergency managers, insurance specialists, lawyers, governmental authorities and other experts. A failure to analyse the situation in a comprehensive way will inevitably lead to unacceptable damage or even karst related disasters.

The paper considers one of the possible aspects of karst risk assessment for constructions that are sensitive to various superficial karst phenomena in the territories with covered karst. Prof. J. Cvijić was the first scientist to highlight the necessity to distinguish between ‘bare karst’ and ‘covered karst’ (Cvijić, 1893, 1895).

Federal Legislation of Russia describes risk as the probability of life hazard, injury to people, damage to property or the environment with respect to the degree of harm. For the purposes of building on karst the notion of karst risk should be understood as probability of negative impacts of karst phenomena which can cause multi-aspect damage of social, economic and/or environmental character (meanwhile, engineers should bear in mind welfare of the contemporary and future generations). The authors believe that such an over-all and comprehensive understanding of karst risk conforms to the UN concept of “sustainable development” (Tolmachev, 2014). Building in karst regions, as a rule, requires consideration

of economic and social types of probable damage. Damage to the environment becomes an additional important issue at the stages of development and operation of nuclear power units, power stations, oil pipelines, chemical plants, landfills and hydraulic facilities.

The authors attempted to make specialists believe that various aspects of origin and development of karst features should be considered in order to get a higher level of accuracy of karst risk assessment through differentiation in prediction of probable types and extent of damage. The present approach is discussed in some publications in the Journal of the Geographical Institute "Jovan Cvijić" (Makhnatov, 2013; Tolmachev, 2013), as well as in some articles (Khomenko, et al., 2013; Khomenko, et al., 2014).

DISCUSSION OF KARST PHENOMENA IN COVERED KARST TERRITORIES

Types of karst phenomena

Covered karst territories are characterized by a great variety of superficial karst phenomena, which need to be carefully investigated and taken into account by specialists during construction and further in the course of operation of buildings and facilities. Each karst phenomenon affects neighbouring constructions in its own way. From the point of view of assessment of various damage types caused by superficial karst phenomena we can differentiate between at least six types of karst phenomena which may have significant practical importance, which are: potentially probable collapse, local subsidence, old sinkhole, differential foundation settlement, slow subsidence, karst (karst-suffosion) soil slump. The order in which the karst phenomena are mentioned usually reflects a descending risk level. However, in some cases within a particular system "karst-construction" the dependence may significantly change.

The selected types of karst phenomena are discussed below from the point of view of engineering practice. The features of the karst phenomena which have the most considerable importance for karst risk assessment are marked by * sign.

Potentially probable collapses

*Collapse that deforms the ground surface or happens under the foundation of the construction as a rule develops instantly without any visible symptoms. Collapses are responsible for gradual deformation of constructions and facilities, loss of stability of tower constructions and a number of

railway accidents (Sorochan & Tolmachev, 2007). Evidently, in the situation of collapse hazard priority belongs to the task of social damage assessment because of probable loss of life (Figure 1).



Fig. 1. Sinkhole collapse caused under residual building (Rasstrigino, Vladimir region, Russia, 1972)

*Sinkhole development is a typically probabilistic event in time, space and sinkhole dimensions. Having established a stochastic mechanism of sinkhole development in a particular territory, we can in a quite accurate way assess the risk of negative impacts of sinkholes that appear in the vicinity of particular constructions or in a unit area per unit time period. Then, the obtained risk value can be compared with an acceptable risk value (Tolmachev, 2013). The result of comparison will help to choose a proper sequence of activities directed at prevention or reduction of corresponding damage and karst risk in general. This approach allows specialists to assess "residual karst risk" which is necessary to know in order to incorporate "karst insurance" into the system of karst protection activities.

* Repeated collapse is very likely to develop right on the spot once stricken by a sinkhole or nearby in the neighboring area. This is the threat to bear in mind when choosing a location for the construction site of a new project. Failing to consider this evidence has often resulted in catastrophic accidents (Tolmachev, 2005).

*In some karst regions there are territories endangered by conditions for development of an enormous collapse with the sinkhole diameter exceeding 30 m (Figure 2).

Probability of such large-scale collapses is relatively low; however, social damage in case of collapse is extremely high, as no rational karst protection against it is possible. The situation is usually complicated by the presence of numerous small-sized sinkholes and karst-suffosion soil slumps all around such enormous sinkholes. Moreover, within the service life of an existing construction probability of smaller deformations is quite high. As global experience shows, it is practically impossible to avoid loss of life (meaning contemporary or future generations), if an enormous sinkhole develops near buildings. Therefore, to avoid accidents accurate mapping of endangered areas should be done on the basis of special studies (Kutepov & Kozhevnikova, 1989; Utkin et al., 2015).

Local subsidences

*Development of a sinkhole (mould) provoked by local subsidence happens within a period from several days to several months, unlike instant development of a collapse.

*Final mould dimensions on the ground surface may reach up to tens of meters while the depth remains at a relatively low level of 1–2 m.

* A noticeable horizontal movement of ground often happens within a mould.

*Marginal mould zones are characterized by decreased bear capacity and increased water permeability.

As the discussion of the features of local subsidences shows, their impact on structures and facilities results in considerable economic damage. However, loss of life is almost improbable. As structures of many buildings and facilities mainly deform gradually, there is enough time to prevent destruction and guarantee safety for people.

Three accidents described below illustrate typical situations:

(1) unacceptable level of deformation of a residential building in Moscow (figure 3) – within a few days the residents had to move to a new place, and later the building had to be pulled down;

(2) dangerous deformation of a frame building used for chlorine storage at a water supply plant in Nizhny Novgorod (1993) – the chlorine had to be pumped out promptly, the personnel had to be evacuated and the building was gradually demounted;



Fig. 2. Enormous collapse in Berez-niki city, Perm region (2007)



Fig. 3. View over local subsidence under residential building in Moscow (1977)

(3) vertical settlement and horizontal movement of a railway track Moscow -Nizhny Novgorod (1995) – rail transit was halted for several hours, and though after remedial work train operation was resumed, an imposed speed limit remained valid for a long time.

Old sinkholes in the location of constructions

Probability of collapse is always high within the areas of old sinkholes, their neighbouring zones, differential foundation settlements, slow subsidences, and karst (karst-suffosion) soil slumps.

*In case of anthropogenic effects (dynamic and static loads, water leakage from utility pipelines, etc.) probability of severe deterioration or even destruction of objects is close to one. It means that in such a situation the deformation should not be regarded as an occasional event. Furthermore, insurance of constructions and buildings against damage caused by karst in such cases does not look lawful.

As follows from the discussion, there are numerous reasons why new construction must be prohibited within the zones of old sinkholes. An illustration of catastrophic consequences is an accident in Dzerzhinsk (1992) ending fortunately, without loss of life (Makhnatov, 2013; Tolmachev, 2005).

Differential foundation settlements

*This type of settlements presents a real danger under the following conditions: (1) karstified rock lies in a compressed width and the surface of the karstified rock is characterized by depressions, vertical channels, caverns, layers of dolomite powder, etc.; (2) compressed layer of overburden includes buried sinkholes and includes locations with deconsolidation of soil as a result of karst processes.

Deformation of this kind causes relatively insignificant damage to constructions which, however, happens regularly, thus inflicting certain economic losses. Thus, for most constructions there is no need to account for social damage. An exception should be made only for especially important constructions, like high speed railways, large bridges and nuclear power plants.

Slow subsidences

*Development of a subsidence mould on the ground surface in the regions of sulphate and carbonate karst usually takes a very long time (from several years to several decades).

*Vertical speed of subsidence varies in different parts of the mould from several millimeters to several centimeters per year.

*Moulds can have very different shape and may stretch to up to several hundred meters.

*Vertical subsidences are usually followed by horizontal movement.

*Marginal areas of moulds sometimes develop sinkholes.

All the above features of slow subsidences can endanger linear types of constructions, for example, pipelines or railways, especially if maintenance is not arranged in a proper way or special karst monitoring is not provided.

Karst (karst-suffosion) soil slumps

*Diameter of slumps usually equals up to 3 m, and their depth seldom exceeds 0.5 m.

*Development of a single slump in the foundation of the construction does not usually lead to any significant damage to usual buildings, but can become a real threat for frame buildings with isolated foundations, and also for footings of bridges and high-voltage power lines, etc.

*Sometimes slumps are followed by collapses. This way slumps may be regarded as a symptom of the sinkhole development process. This important fact should be remembered at the stage of exploration.

*Very often areas around sinkholes are spotted with slumps, the number of the latter being tens of times larger than the number of sinkholes. Some practical cases were reported when slumps damaged foundations of buildings to a critical level. Severe impact of slumps is generally observed in case of continuous anthropogenic effect (long-lasting water leakage from pipelines, vibro-dynamical disturbance of soil, etc.). The authors studied a phenomenon like this at one of the city water works in Nizhny Novgorod.

CONCLUSION

Prof. J. Cvijić was the first scientist in the XIX century to draw specialists' attention to the applied significance of the impact of various karst phenomena. His ideas were appreciated and widely used by Russian engineers.

Construction of buildings and facilities in karst regions requires assessment of karst risk, that is, probability of deterioration or even destruction of buildings and facilities by various karst phenomena which generally involves economic, social and (or) environmental damage.

Prediction of karst risk can be done with greater accuracy, provided the researchers consider the exact type and extent of damage which in their turn greatly depend on the type of karst phenomena and specific impacts on particular constructions.

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150TH ANNIVERSARY OF
JOVAN CVIJIĆ'S BIRTH



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SCIENTIFIC MEETINGS / BOOK CLXII

PRESIDENCY | BOOK 10 / VOLUME II

150TH ANNIVERSARY OF JOVAN CVIJIĆ'S BIRTH

Proceedings of the International Conference
held at the Serbian Academy of Sciences and Arts,
October 12–14, 2015

Editors

VIDOJKO JOVIĆ
ANA M. PETROVIĆ

BELGRADE 2016



Publisher
Serbian Academy of Sciences and Arts
Belgrade, Knez Mihailova 35, Republic of Serbia

Technical Editor
Mira Zebić

Translator
Homework Translation Agency, Belgrade

Cover design
Dragana Lacmanović

Design
Raša Hindawi

Print run
500

Printed by
Colorgrafx

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ANTHROPOGEOGRAPHY



CARTOGRAPHIC REPRESENTATION IN CVIJIĆ'S BOOK ON THE BALKAN PENINSULA - ANTHROPOGEOGRAPHIC CHARACTERISTICS

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ABSTRACT: Cvijić's capital book "Balkan Peninsula and South-Slavic Countries" represents a complex geographic view of a defined area. This work is considered to be his most important work in the fields of ethnology and anthropogeography, showing the influence of geographic environment on life and development of human societies. Extraordinary quality of this text is substantiated by opinions of contemporary experts working in this field that hold this work to be unprecedented even today. The book consists of two parts. The first part analyses geographic environment, geographic characteristics of covered space, defines natural areas, influences of social and geographic elements as well as ethnographic and sociological characteristics. The second part is devoted to analysis of anthropogeographic characteristics of the population. Abundance of figures greatly help to better understand extraordinary textual analysis. A special note is reserved for maps that show climate zones, civilizational zones, origins of Northern Serbia population and types of villages and houses. This paper analyzes cartographic figures, description of contents, utilized cartographic expression tools and methods.

Key words: Balkan, anthropogeography, cartography, cartographic method

INTRODUCTION

The subject matter of this paper is Jovan Cvijić's great work titled *The Balkan Peninsula* (Cvijić, 1922/1987), which was republished by SANU (Serbian

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Academy of Sciences and Arts), NIRO "Književne novine" (Literary Gazette, Press and Publishing Work Unit) and Zavod za udžbenike i nastavna sredstva (Institute for Textbook Publishing and Teaching Aids), Belgrade, as publishers, with academician Vasa Čubrilović as the chief editor and Mihailo Miletić and Dragutin Ranković as editors. It is about the third edition of this Jovan Cvijić's work that appeared originally in the French Language in 1918. Subsequent researches in Jovan Cvijić's works have demonstrated that this is his major anthropogeography and ethnology work. The foregoing Editorial Board was of the opinion that Cvijić's researches in the geographical location impact on the life style and historical development of human communities to that point had been unmatched. It is important to emphasize that comments presented also opinions on Cvijić's scientific standpoints and conclusions relating to the Balkan region's nature, life style and population.

CARTOGRAPHIC ANALYSIS

The analysis of cartographic figures, description of contents and utilized cartographic expression tools and methods (Lješević & Živković, 2001) was used in this paper.

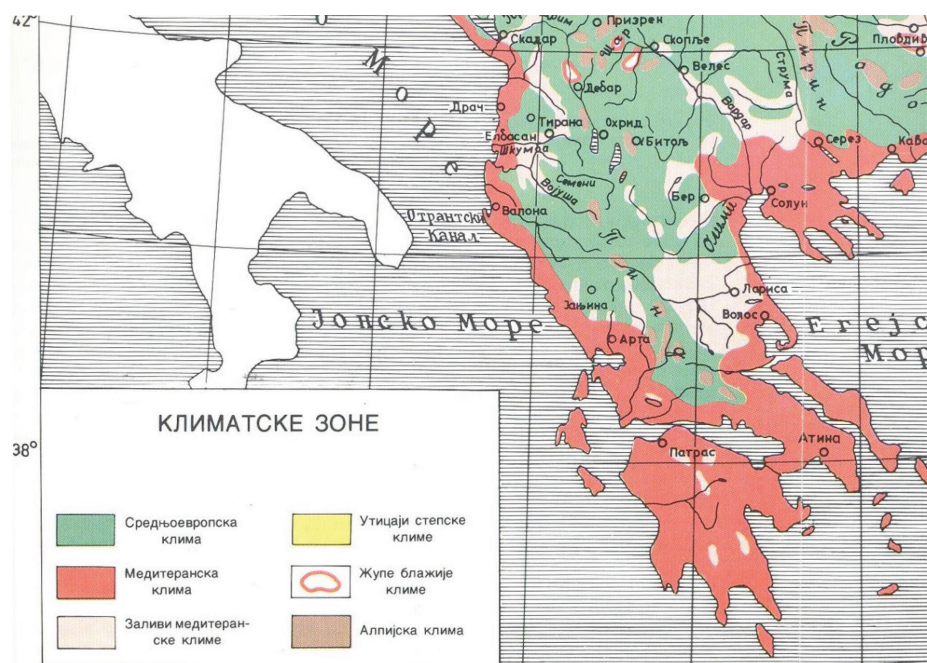
Jovan Cvijić's work *The Balkan Peninsula* comprises two volumes, i.e. Volume I: Geographical Location and Men, containing four Sections and eighteen Chapters and Volume II: The Balkan Peninsula and South Slavic Countries, comprising five Sections and eighteen Chapters.

As Cvijić said, the Balkan Peninsula is a land mass with its northern side connected widely to the European Continent, western side bordering Dinarides that lean against Alps, whereas, in the east, there is the Carpathian - Balkan region arch. The northern border comprises the Sava and the Danube River flows respectively, while the Adriatic, the Ionian, the Aegean, the Marmara and the Black Seas border its southwestern, southern and southeastern sides respectively.

As an important supplement to a very broad and intricate text, given were also numerous photos, schematic representations and maps. Cartographic depictions highlight Climate Zones, Civilization Zones, Origin of the Northern Serbia Population, Movements of Population Involved in Livestock Farming and Areas of Tribes and Cooperatives, Village Types, House Types, Mentalities and Varieties of South Slavs, and the Balkan Peninsula Map.

Five maps were made on the same plan, so they are of the same characteristics. The maps do not give any data to refer to a map projection

used for their developing. The map margins record the coordinate system, with indicated geographic coordinates for longitudes and latitudes on the maps' northern and western margins respectively. The map scale is given as the scale ruler with the basic scale division of 50 km, except for the *Village Types* map on which it is given as number. The maps do not contain survey plan points, which has not been expected anyway since these maps are thematic ones. As for geographic features, only more important water bodies and bigger settlements are marked as physical - geographical and social - economic contents respectively. As for editorial elements of the map, only the title, scale ruler, and captions containing particulars of the thematic contents are given.



Addendum 1. *Climate Zones map's extract*

The Volume I's Chapter Four, titled *Climate, Soil and Vegetation*, gives *Climate Zones* map as an addendum. The Chapter is dedicated to clarifying climate characteristics and their causality. Based on the considered characteristics, Cvijić concluded that the climate was impacted less by latitude and more by the morphologic features of space. The map shows the Balkan Peninsula with previously defined boundaries and with four zone-based climate types that Cvijić identified within this region, and including also aerial method-based separate climate areas identified as *Temperate Climate Zones*.

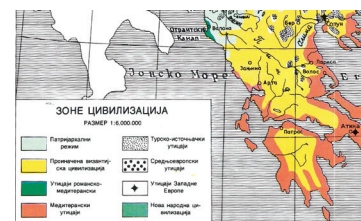
Colors were used to distinguish the contents. The color green marks the Central Europe climate; the color red marks Mediterranean climate; the color yellow marks the areas that are under the semi-arid (steppe) climate impact; and the color brown marks the alpine climate. The largest area of the Peninsula is impacted by the Central Europe climate, covering its entire central part. The said climate is prevalent in these areas thanks to the openness of the Peninsula to this side of the European Continent, sloping to the north and having numerous valleys that ensure the inland penetration of the climate. The entire southwestern and southern part of the Peninsula, starting from the Gulf of Trieste and going to the Bosphorus, is with the Mediterranean Climate. This type of climate cover also the river valleys (of Vardar, Maritsa, Drin, Bojana and Neretva, ...respectively) through which its impact penetrates inland area. (1.38) The strip that is under the impact of the semi-arid climate is the area stretching from the Bosphorus to the Danube River delta on the Black Sea coast, including also the areas alongside the lower Danube where the climate impact is obvious. The Alpine climate covers the areas of the Peninsula's larger grazing lands. Particular circular marks point out to the areas identified as *Temperate Climate Zones*.

Chapter Nine titled *Cultural Zones* analyzes the impact of a variety of civilizations on the Balkan areas. Cvijić concluded that the lack of cultural effects continuity was the feature of the Balkan Peninsula (1.115). Likewise other maps out of this map set, this map was also developed by zone-based method and it used colors to distinguish the contents. The map displays eight cultural zones that are identified by different marks in the caption underneath. The color light green marks the space dominated by *Patriarchy Regime*. The said region, as Cvijić defined it, is the one with high moral values, specific life style organization and with sure artistic senses for poetry and ornament and it includes the Peninsula's northern border stretching from the River Soča in the west to the Black Sea in the east. The color yellow identifies the space of *Modified Byzantine Civilization*. It is defined as to a certain extent altered Byzantine culture that, once upon a time, dominated the whole Peninsula. The color darker green marks the area under the Roman and Mediterranean influence and it covers the coastal region of the Adriatic Sea, whereas the region under the Mediterranean influence only is marked by the color (brick) red and it covers the whole Aegean littoral. Small black dots identify the *Turkish and Eastern Influence*, which covers the areas of the Peninsula's eastern perimeter including the distributaries from the Aegean Sea shore stretching toward the inland. A bit larger black dots mark *Central European Influence* that was the most intensive along the Peninsula's western perimeter. This

influence decreases toward the central region, but it appears also at the far end of the Peninsula's east. *The Western Europe Influence* is displayed by the solid black circle with small dashes on its perimeter. This identifier marks only the larger towns such as Belgrade, Athens, Thessalonica, Sofia and Constantinople. The color green marks *New National Civilization* that was present in the region of the confluences of the Rivers Drina and Sava and the Rivers Morava and Danube respectively.

Chapter Fourteen is titled *Division of land: Crafts and Life Styles*. A component part of this Chapter is also *The Movements of Population Involved in Livestock Farming and Areas of Tribes and Cooperatives* map. It belongs to the thematic map set developed on the same plan. This map was developed by means of movement lines, so lines are used as identifiers. The movements of the South Slavs, the Aromanians and the Arbanasi involved in livestock farming are displayed respectively. The color orange dotted lines marks the Eastern Boundary of the Cooperative Life, while the color green dotted lines display *The Region of Tribes*. The map presentation shows clearly that all movements were taking place from the high mountain areas to the river valleys, valley and littoral areas. (1.197)

Village Settlements is the title of Chapter Sixteen that works out village types. The map was developed by means of zone-based method and colors were used as identifiers. At the very beginning of the Chapter, villages are divided into two groups according to their respective positions, i.e. villages located at up to 1,600 m altitude and villages in valleys, ravines and structural basins (1.235). Further detailing describes the village positions to the area terrain features. A component part of this Chapter is the thematic map which displays the village types. The caption underneath is divided into two segments. Villages of nucleated and dispersed character were marked. Through analyzing the map, it has been found that the dispersed villages are within the Western Balkans, although some of the same group's village types exist also in the central zone (the Ibar type). The dispersed village type exists mainly in the Peninsula's central, southern and eastern areas; however, it appears also in areas with majority nucleated village type. In the group of dispersed type, the color light green marks the Old Valachian (*Starovlaški*) type covering the area stretching from the Peninsula's west, from the River Soča in the west to the Kolubara River valley in the east, while the color darker green identifies the *Šumadija* type present within the zone around Kragujevac and from there to Belgrade, and the color dark green identifies the *Mačva* and *Jesenice* type that is typical of the area alongside the right bank of the River Sava, going from the Bosna River mouth from Šabac, and the area from Bel-

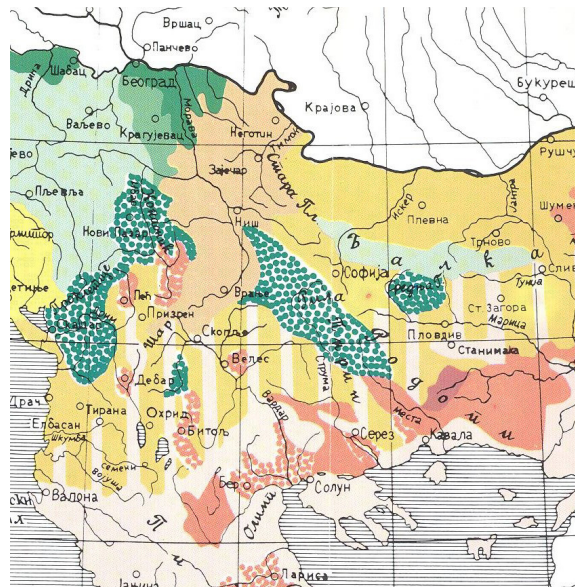


Addendum 2. *Civilization Zones map's extract*



Addendum 3. *The Movements of Population Involved in Livestock Farming and Areas of Tribes and Cooperatives map's extract*

grade including the confluence of the Rivers Morava, Mlava and Pek and the River Danube. The Ibar type is identified by means of the color green dots and it covers the areas of the Ibar and Drin River valleys, the area around Novi Pazar and the Kopaonik Mountain Range. This type is present also in the area to the south of Niš to the mountains of Rila and Pirin. In addition, the villages of nucleated type are divided into five sub-groups as follows: the villages located within the area of the South Mrava and Timok River valleys - on the map, they are marked by the color orange. The color intense orange dots identify the Čitluk's villages that are located around Peć (Pejë), to the south of the Kopaonik Mountain Range, around Veles, Bitola and Thessalia. The Greek and Mediterranean type is identified by the color light orange and is present within the whole southern part of the Peninsula, including the Mount Athos, and the Marmara Sea shore; however, it is blended with the Mixed Village Type that is identified by the color intense yellow and that exists within the Peninsula's central stretch from Drač (Durrës) and Elbasan (Elbasani) to the west of Burgas on the Black Sea coast. The Turkish and Eastern type is displayed by the color intense and it is actually island-dispersed village type. They stretch over the areas to the west of Mount Olympus, to the north of Thessalonica, to the north of Kavala, to the south of Edirne and to the east of Shumen.

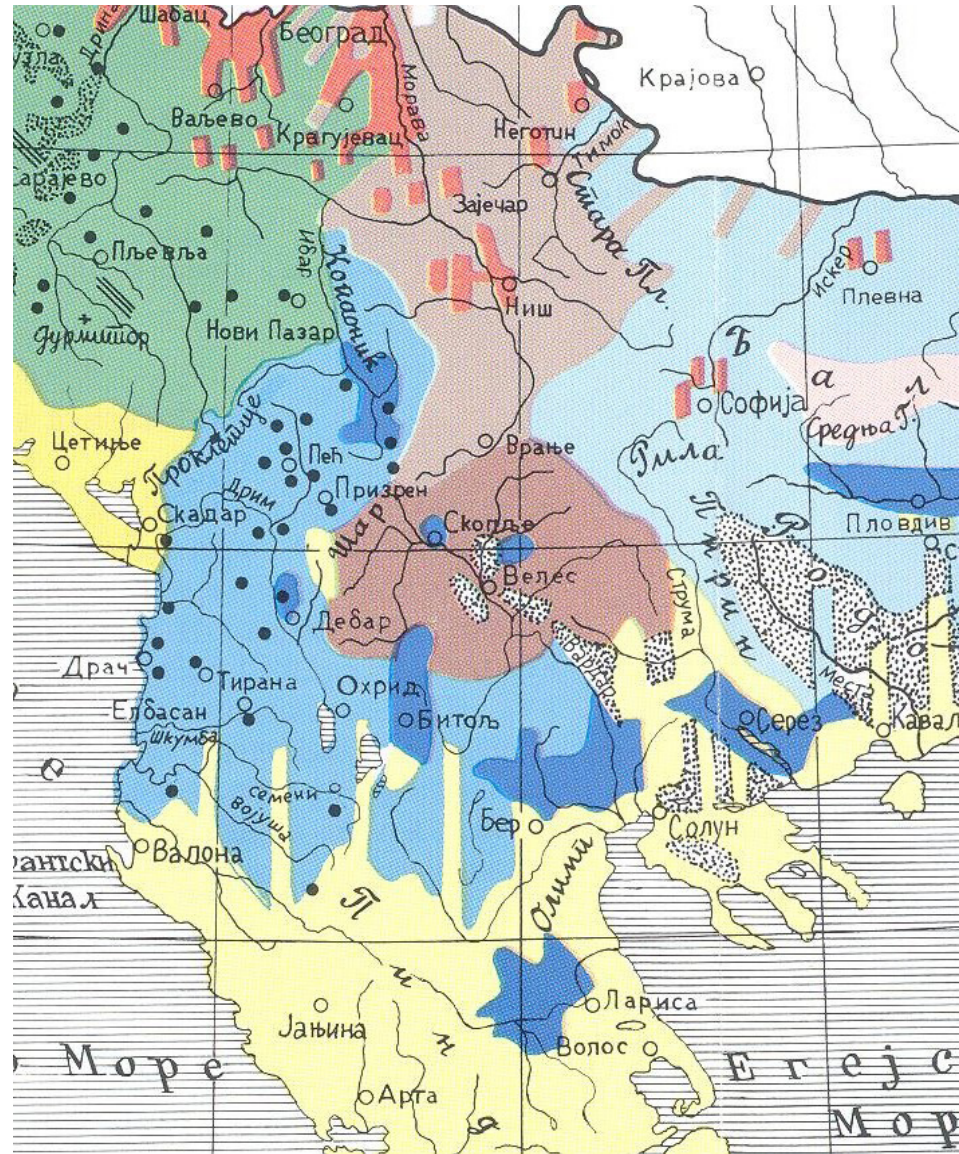


Addendum 4. Village Types map's extract

In the Chapter Seventeen, Cvijić worked out the house types. The same title is given to the thematic map that was developed by means of zone-based method and that used the color to identify the house types displayed on the

map. The map shows thirteen house types detailed in the caption underneath. The color green identifies the Dinaric log cabins that exist within the region of the Karawanks in the west and going to the Ibar and Morava River valleys in the east. The northern border is actually the River Sava flow, while the south one comprises the area from and including Dinarides to the Prokletije Mountain Range. Throughout the foregoing zone, the Alpine, Turkish and Eastern and Tower house types' influence is present. Identified by the color dark yellow, the Karsko-Adriatic stone house type exists within the area to the south of the latter one (within the Istria – Dalmatia – the Bojana River mount stretch). The colors light and dark brown identify the Morava and Vardar types respectively. They exist in the same-name river valleys. The Čitluk house type exists on the southern slopes of the Kopaonik Mountain Range, near Debar and Bitola, to the east of Larissa, in a part of Aegean Macedonia, around Sérres, and in parts of the Maritsa River valley. The Turkish and Eastern house type exists in the area stretching from the Balkan Mountain Range and the Rila Mountain Range in the west to the Black Sea shore in the east. The western and southern part of this area is intertwined with other house types, such as the Turkish and Eastern type and the Greek and Aegean type. The Turkish and Eastern and the Greek and Aegean house types exist within the area of the Kopaonik Mountain Range, the Prokletije Mountain Range, the Adriatic Sea shore from Lezhë to Valona and eastward to the Aegean Macedonia. The Greek and Aegean house type exists within the area from the Strait of Otranto, going alongside the Ionian and Aegean Sea shores respectively all to Constantinople. Within the area from the Mount Athos to Constantinople, this house type is replaced by the Turkish and Eastern house type. Within the area of the Balkan Mountain Range, there is a detached area where houses are constructed in a modified manner on the model of the Morava house type. The detached area is marked by the color light pink. Newer type of houses made from bricks and covered by tiles exists alongside the right bank of the River Sava and it is typical of the Kupa, Vrbas, Bosna, Kolubara and Morava River valleys respectively.

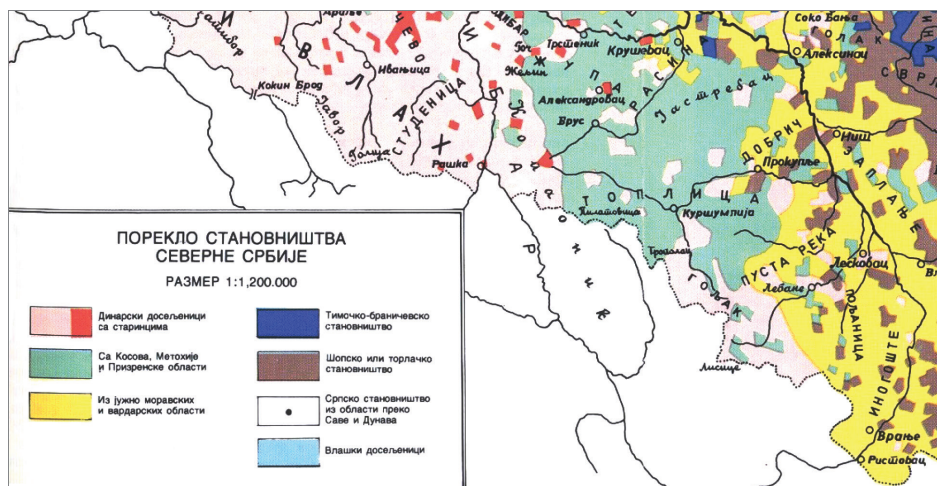
Chapter twelve considers the consequences of migration, containing the thematic map titled *The Origin of Northern Serbia Population* as a very interesting contents segment. The said map was also developed on the same principle as the foregoing maps; however, the caption underneath contains the numerical indication of the map scale (1:1,200,000). The caption also refers to six groups dominating the area bordered by the Sava River and the Danube River in the north, the Balkan Mountain Range in the east, the Kopaonk Mountain Range and the Mount Golija and the Mount Zlatibor in the south and the River Drina in the west. The central and western parts of



Addendum 5. *The House Types map's extract*

this area are settled by immigrants from the Dinarides, the Morava River valley is inhabited by the Timok and Braničevo population, while the area situated in the east is populated by immigrant Vlachs. The eastern perimeter is populated by the Shopi and the Toplice people. The south-east is inhabited by peoples from the South Moravian and the Vardar areas. The area from the east of the Kopaonik Mountain Range to Kragujevac in

the north and to Kruševac and Prokuplje in the east is populated by the peoples from Kosovo, Metohija and from the Prizren area. The color black dots identify the dispersion of the immigrant population from the areas across both the River Sava and the River Danube. They are to the south of the Sava River flow, from the confluence of the rivers Drina and Sava, to Golubac by the River Danube, while in the inland they are mostly within the area of the Morava River valley. (1.256)



Addendum 6. *The Origin of the North Serbia Population map's extract*

As a supplement to the text in the Volume II that deals with anthropogeography of the Balkan Peninsula, there are two physical geography maps with slight differences therein. The map comprised by this Chapter displays The Mentalities and Varieties of South Slavs, whereas the second one stands for a supplement to The Balkan Peninsula work. The maps do not give any data to refer to a map projection used for their developing. The map margins record the numbers indicating geographic coordinates for longitudes and latitudes, while the caption underneath refers the numerical scale (1:3,000,000) and scale ruler with the basic division scales of 50 km. As for physical geography elements, the map displays terrain features (marked by the colors brown and green respectively) and hydrographic elements (marked by the color blue). As for social and economic elements, only larger settlements and geographical names, while the second map contains major communications as well. The first map, which is included in the before-mentioned Chapter (The Mentalities....), makes use of the color red solid line to draw the boundaries that separate mentalities (Dinaric, Panonian, ...), whereas the thinner broken line to refer to their varieties (Adriatic, Šumadija,...).



Addendum 7. *The Mentalities and Varieties of South Slavs map's extract*

CONCLUSION

Upon considering the whole this piece of work, we can conclude that the maps concerned mirror in a high quality manner the textual contents presented; that all maps were developed by means of almost the same method and that they used color identifiers; that, regardless of numerous photos and schematic overviews, it is a real pity it does not contain more cartographic representation since the piece of work has an abundance of high quality presentations of analytical and synthetic accounts of selected antropogeographic characteristics of the Balkan Peninsula.

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FROM *TURISTIKA* TO TOURISM STUDIES

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Stevan M. Stanković**, Jovana Brankov*, Aleksandra Terzić*

ABSTRACT: The first records of tourist travelling in the territory of Serbia date from the 19th century, and the first destinations mentioned were the spas of Sokobanja, Bukovička Banja and Vrnjačka Banja, as well as the Vršac Mountains, Mount Tara and others. In international scholarly literature, tourism was first mentioned as a geographical scientific discipline in 1905. While researching in the field settings, Jovan Cvijić recognized the significance of natural and anthropogeographic sites as elements of recreation and entertainment. In the first issue of the *Bulletin of the Serbian Geographical Society*, Jovan Cvijić introduced the term “turistika”, laying foundations for the development of tourist geography. Until the 1960s, in studies dealing with regional and economic geography, tourism was analyzed as an economic activity. The first post-graduate course in tourism geography was introduced at the Department of Geography at the Faculty of Science of the University of Belgrade in 1962. At that time, this scholarly discipline began to develop and very soon, studies in this area would take a dualist character – tourism geography (tourismology) and tourism economics; since the 2000's the study of tourism has become interdisciplinary. The aim of this paper is to highlight the importance of tourism geography, as a geographical scientific discipline which sublimates various lines of Cvijić's research, viewed through the perspective of cultural tourism, rural tourism, sports and recreation tourism, event tourism, etc.

Key words: turistika, tourism studies, tourism geography

INTRODUCTION

Tourism as a geographical scientific discipline was first officially mentioned in 1905 in the book *Tourism* by Dr. Joseph Stradner, published in Graz (Austria). In this book, the concepts of tourists, tourist regions, attractiveness,

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etc. were first defined and explained. In the first issue of the *Bulletin of the Serbian Geographical Society*, Academician Jovan Cvijić, introduced for the first time the concept of "turistika" to designate tourism-related geographical research and concepts. From that moment on, until the 1960s, research in the field of tourism was largely part of economic and regional geography. In 1962, the first generation of post-graduate students were enrolled in the Tourism course at the Department of Geography at the Faculty of Science and Mathematics of the University of Belgrade. Since the 1970s, until today, tourism geography in Serbia has undergone specific development as a scholarly discipline and an academic subject. The tourismological concept (which lays accent on tourism geography) of tourist studies is fostered at the Faculty of Geography of the University of Belgrade; Department of Geography, Tourism and Hotel Management at the Faculty of Science and Mathematics of the University of Novi Sad; and the Geographical Institute Jovan Cvijić SASA (Bjeljac, 2012). This paper seeks to present the development of tourism studies in Serbia in greater detail.

FIELD RESEARCH CONDUCTED BY JOVAN CVIJIĆ AS THE BASIS FOR THE DEVELOPMENT OF TOURISM GEOGRAPHY

Among the giants of scientific thought and university teaching in our country in the late 19th century and the first quarter of the 20th century, Jovan Cvijić stood out for several reasons. As the first geographer educated according to modern standards, he shifted the limits of Serbian, Balkan, European and global science through the institutions that he founded and where he worked, as well as through his published works. By deciding to explore the tectonics of the Balkan Peninsula, geomorphology, glaciology, karst terrain, speleology and anthropogeography, he was, and has remained, far ahead of his time. Being aware that the geographical phenomena, processes, events and structures must be investigated in field settings, Jovan Cvijić conducted his first research trip in Jadar and the Drina River valley in his student days, and it was already then that he chose to do field research in his future career. He would practice this kind of research over the following forty-two years. Although his findings obtained in field studies were not directly related to tourist activities, they played an important role in establishing tourism geography as a scholarly discipline. Nowadays, some of Cvijić's studies are interpreted as a platform for the further development and organization of tourism-related activities.

What is readily observed as particularly significant is Cvijić's extensive scholarly work in the area of anthropogeography, the most complex

scholarly discipline that deals with the overall relations, phenomena and processes related to humans, human society and the environment. The studies of relevance in this context include the *Guidelines for the Study of Villages*, i.e. a sort of a questionnaire, based on which Cvijić's associates interviewed more than 700,000 people with the aim of obtaining data about numerous rural settlements, and published studies that remain relevant today. Among the questions from Cvijić's guidelines, several are directly and indirectly related to the phenomena and processes of importance for tourism. We highlight some of them (Cvijić, 1987, 23): Where is the village; is it in a plain, near the river, or on the sides of a river valley (exposed to the sun or in shade), or on a hill, on a slope, or on a mountain?; Are the houses within the village located on several hills or slopes, and what are the names of these hills or slopes?; Are there in the territory of the village any thermal, salty, acid or iron-rich springs?; Do people use the water from these springs?; Are they used by peasants from the surrounding areas and does the village benefit from it?. Based on the guidelines and extensive field research, Jovan Cvijić performed a detailed classification of rural and urban settlements and the types of houses in them. As far as towns are concerned, many of which are now important tourist centres, he paid special attention to their geographic position, traffic connections, tradition, lifestyle and economic characteristics.

"Cvijić's study of our nation did not pass without impact on the general direction of ethnographic, anthropogeographical and geographical, socio-economic, historical, and even in our time, sociological research. He introduced new principles and methods in the study of folk life. Folk life was no longer examined using only descriptive and factographic approaches, with sporadic use of the comparative and genetic methods. Cvijić introduced new standards, whose basic characteristics were the complexity of research of an instance of folk life and, if one can say so, a genetic and dialectical interpretation of these notions and manifestations." (Stojančević, 1965, 19) This is of relevance for modern rural tourism and ecotourism, which, both in our country and globally, have a growing number of supporters and which contribute in their own way to the preservation of tradition, monumental and ethnographic heritage, as well as the environment in general.

As a second-year student of the Great School, Cvijić travelled through Serbia with his geology professor, Jovan Žujović. In the field, he encountered numerous and various karst forms of relief. Kučaj served as a source of inspiration for all subsequent studies of karst phenomena, forms and processes. While studying in Vienna, Cvijić frequently travelled to the Alps with his PhD tutor Albrecht Penck, and there he encountered the

traces of Pleistocene glaciation and the erosive and accumulative forms of glacial relief. Later, when he saw the “white caps of Rila” in Bulgaria, while standing on Midžor, the highest peak of Stara Planina, he was sure that the highest mountains of the Balkan Peninsula had been affected by Pleistocene glaciation, which was at that time unknown to European glaciologists. After extensive field research, he published the famous study *Tragovi starih glečera na Rili (Traces of Ancient Glaciers in Rila)*, thereby laying the foundations of glaciology in this part of the world. His research can still be used in drafting plans and programmes for the development of mountain tourism and the organization of mountain tourist centres.

Particularly important is Cvijić’s interest in studying underground forms of karst relief. His study on Prekonoška cave, located in the vicinity of Svrlijig, laid the foundations of modern speleology. The research into this science has served as the basis for caving tourism, which is today well-developed in France, Switzerland, Slovenia, Serbia and other countries. Although his research intentions were not aimed at applicative actions towards adapting the area around speleological and geographic objects and their valorization, over time, his ideas were put into practice for the benefit of local population, tourists and businesses. On this special occasion, we will quote those Cvijić’s sentences from his study on the Prekonoška cave in which the term *tourist* is probably mentioned for the first time in Serbian scholarly literature. As he knew that Prekonoška Cave had been visited in 1836 by the Serbian Prince Miloš Obrenović and the French researcher Ami Boué, as well as the Serbian King Milan Obrenović in 1888, Jovan Cvijić noted down: “Before his arrival in the Prekonoška cave His Majesty ordered that the path be repaired and fenced, the opening of the cave expanded, the door for the cave set up and that everything be arranged so that it may not be permitted to everyone to enter it, rummage at will and dig. The key to the door is kept by a municipal councillor. All this now calls to mind the well-maintained Carniolian caves and a tourist who comes here has a feeling of being in a country that is already starting to develop a taste for sights of nature.” (Cvijić, 1891, 272)¹.

Jovan Cvijić was intensely involved in the study of geography, geology and geomorphology of the Balkan Peninsula. He highlighted the importance of its geographical and functional position and traditional traffic routes from Roman times to the present. He was able to clearly identify the elements of integration and permeation, separation and isolation of

1 Since the times when Cvijić conducted his research, to the present day, several thousand caves, rock shelters and caves in Serbia have been investigated. Speleological tourism is practiced in eleven caves in Serbia which are adapted for this purpose.

contacts and transits and offer their optimal scientific interpretation. In modern tourism geography, these elements are taken into account as factors, which together with the ratio of the contraction areas of tourist sites and centres and the dispersion area of major cities, industrial centres and densely populated regions, determine the direction, scope and dynamics of tourism trends in terms of overall functionality. He studied in detail the elements of the influence of various cultures that converged in the Balkans, increasing the significance, appeal and attractiveness of the region in modern tourism. Material remains, such as cultural heritage and the elements of spiritual culture, imprinted with specific ethnic features, are the basis for the development of tourist movement patterns related to cultural events, and they are studied by tourism geography, art history and economics of tourism.

“In 1888, I began to systematically explore the Balkan Peninsula, spending at least the summer months of every year on this journey. It was natural to start my research on my native soil, that is in Serbia. It was only after long effort that I have gradually become aware of problems present in the Balkan Peninsula. They were mainly tectonic and geomorphic in nature.” (Cvijić, 1965, 58) As natural tourist values are the basis for the research into tourism geography, the findings of Jovan Cvijić, presented in his extensive books in the field of geomorphology are still pertinent.

In the account of his research trips in 1898, Cvijić, inter alia, relates that he departed from Metković on a ship to Albanian ports. “As steamers stop for several hours at the ports of Durres and Vlora, I could briefly visit both Albanian towns as a tourist.” He used the term *tourist* on several more occasions and it is obvious that he knew its correct meaning, i.e. the modern sense of the word. Having positively estimated the importance of railway transport in Bosnia, which was being developed under the rule Austria-Hungary, though for purely exploitative reasons, he stated that “not a single important tourist, especially a newspaper correspondent, could travel through Bosnia and Herzegovina without the knowledge of the Bosnian authorities; each of them was welcomed at the border and specifically trained officers of the Bosnian government were assigned to his service to inform him, in a certain sense, about the country and its people. Conferences for journalists were organized where guests were warmly welcomed and free trips were offered. It took great effort to manage that international conferences be convened in Sarajevo, such the archaeological conference or the excursion that accompanied the geological congress. I know that the participants of the latter conference were so warmly welcomed and treated as nowhere in Europe.” (Cvijić, 1965, 217).

On his research trips, Jovan Cvijić was very modest. The notes of his companions reveal that his daily food ration was a piece of wheat or corn bread, often without any additions. As he carried nothing to sleep in, he spent nights sleeping in shepherds' huts, on hay or fern, and he would often greet the dawn talking with his companions. Cvijić avoided Turkish *hans* and *caravanserais*, because he was averted by dirt. He noted down that the pillows were shiny from fat. "In *han* rooms, there are no beds and the dirt is Augean. There is no greater torment for a traveller than to sleep in these rooms, and one is forced to do this in cold weather. One or two mats are spread on their floors and this is all that can be found in these rooms, the dirt on whose floors is such that it causes one to shudder, while the walls are smudged and almost black. Along with travellers, almost regular guests of these dirty, greasy rooms are rats, whose race and squeal can sometimes be heard throughout the night."

The situation was slightly better in Bosnia, under Austro-Hungarian rule. Although he was very unsympathetic to aggressive Austro-Hungarian authorities, Cvijić pointed out certain positive aspects of construction and landscaping activities. Hotels were available in all major cities. Tourists could enjoy considerable comfort there. Various meetings and conferences were held. There were also new roads and railway lines – of course, built with the aim of exploiting the existing natural resources, particularly the forests. While analyzing the nature of the Austro-Hungarian rule in Bosnia, Jovan Cvijić, critically writes: "The astute authorities in Bosnia and Herzegovina got the idea to introduce an institution, which does not exist anywhere else in Europe, the so-called state-run, clean and well-equipped hotels, which are available in all towns and even in some villages. Travellers enjoy the land of an extraordinary beauty and the East more interesting than the East of Turkey-in-Europe, while having all comforts and conveniences in the aforementioned state-run hotels. This is the same feeling that one has on the snowy and wild peaks of the Swiss Alps, when he happens to find himself in famous Swiss hotels." (Cvijić, 1965, 218)

JOVAN CVIJIĆ'S *TURISTIKA*

A significant part of Cvijić's scholarly and organizational work was carried out through the Serbian Geographical Society, founded by him and his associates in 1910 in Belgrade. In a short, succinct and thoughtful speech, given at the founding assembly, Jovan Cvijić defined the tasks and directions of the activities and development of the first geographical professional association in the Balkan Peninsula. As a man who understood

geography broadly, who was relentlessly striving to establish relations between geography and related sciences, whose frame of mind was multi-disciplinary and interdisciplinary, Cvijić stressed that the boundary areas between geography and related sciences were particularly interesting and that fundamental scientific problems were often found in these areas; such problems were solved using multiple methods of research, both in field settings and at the table.

Among the tasks of the Serbian Geographical Society, he included the popularization of geographical knowledge. He concluded: "This work requires the most willing, active and tireless members. We mainly had them in mind when we foresaw in the Rules of Procedure the establishment of sections of the Geographical Society both in Serbia and outside of it. There are certain facts that these sections will successfully establish in their respective areas. The sections will particularly nurture tourism geography..." (Cvijić, 1912, 3).

In accordance with the above-mentioned programme, as the editor of the *Bulletin of the Serbian Geographical Society*, Cvijić introduced the section *Turistika* already in the first issue and published the following papers by Rista Nikolić – *Penjanje na Šar planinu (Climbing the Šara Mountain)* and *Penjanje na Korab (Climbing the Korab Mountain)*, and Jevto Dedijer – *Penjanje na Maglič (Climbing the Maglič Mountain)*. In the same issue of the *Bulletin*, Cvijić published his own paper on the Petnica cave near Valjevo, whose entryway had been adapted some time before to enable tourist visits, as well as the text by Nedeljko Košanin titled *Izlet na Jakupicu (An Excursion to Jakupica)*. "Hence, already at the beginning of the 20th century, he regarded tourism geography and tourism as modern and very complex social phenomena." (Popović, Bjeljac 2007)

Unfortunately, some of local scholars, and even academicians, underrate this area of scientific research, ignoring the huge importance of the following facts: "Already in 1979, nearly one billion people were involved in various forms of tourist movements, whereas the revenue from these migrations of modern nomads, which cannot be compared in scale to any known migrations in history, amounted to 75 billion dollars" (Vasović, 1994, 223). In the modern period, these figures are significantly higher – 1.13 billion of foreign tourists in the world, with revenues amounting to 1,245 billion dollars (UNWTO, 2015). Jovan Cvijić's *turistika* has developed into tourism geography and tourist studies, scholarly disciplines and university academic subjects.

While travelling through the country and abroad (Vienna, Geneva, Neuchatel, Paris, Grenoble, Karlovy Vary, Prague, Berlin, Athens, Durres,

Thessaloniki, Trieste, Rijeka, Dubrovnik, Zagreb, Split, Subotica, Sarajevo, Istanbul, Bosphorus, Dardanelles, Rila, Đerdap, Scandinavia, the lakes in the south of the Balkan Peninsula, Mount Olympus), Jovan Cvijić had the opportunity to encounter many and diverse tourist values, centres and regions, but he did not publish papers related to tourism geography, which, at that time, practically did not exist as a scholarly discipline, though certain types of tourism – especially spa tourism, i.e. health and wellness tourism – were significantly represented in our country.

As a scholar of an exceptional writing and speaking style, in some of his papers, Jovan Cvijić left words and sentences that belong to the most beautiful literary passages. Particularly typical are his descriptions of Eastern Serbia (especially Mount Rtanj), Šumadija, Lake Ohrid, Loznica, Gučevo, as well as other regions, which anticipate tourist propaganda.

THE DEVELOPMENT OF TOURISM GEOGRAPHY

As a discipline presented through scholarly and technical books, textbooks, applicative projects and university courses, tourism geography – which was in its own way a predecessor of tourism studies and with which it has much in common – is relatively young. In Serbia, the number of scholars who decided to study tourism increased after 1960. Having in mind the complexity of tourist activities, as well as a large number of services that lie in their foundations, it is very important to establish a link between the strategy and policy of tourism and, accordingly, identify the elements that are relevant for the quality management of tourist services; the training of personnel in the tourism industry is very important link in this chain. This fact initiated the research on tourism and, consequently, it gave rise to the need for studying it at all levels of education, not only at the secondary level (Štetić, 2012). Two years later (1962), at the Department of Geography at the Faculty of Science and Mathematics of the University of Belgrade, the first generation of post-graduate students were enrolled in the course Geographical Bases of Tourism. The same year, thirty-six students from the SFR Yugoslavia attended the course and they included lawyers, economists, geographers, philologists and ethnologists. The above-mentioned year may be considered the beginning of organized efforts on developing university education for tourist industry personnel (Popović, Bjeljic, 2007). In 1963, the associates of the Department of Geography at the Faculty of Science and Mathematics of the University of Belgrade compiled a detailed study of *The Tourist Valorization of Yugoslavia's Nature*. In 1967, the study of the economics of tourism was introduced at the Faculty of Economics

in Belgrade. The same year, the two-year Vocational College for Training Personnel for the Tourism Industry was established. In 1974, the two-year Hospitality College (later renamed to the Hotel Management College) was established in Belgrade.²

In 1971, The First Yugoslav Symposium on Tourism Geography was organized in Bukovička Banja and the proceedings titled *Geografija i turistička praksa (Geography and Tourism Practice)* were published. The same year, at the Department of Geography (University of Belgrade), the Institute of Tourism and Spatial Planning was established. A year later, the first generation of full-time students was enrolled in the four-year academic course in tourism. The Sub-Department of Tourism Studies was also established and in 1976. It was transformed into the Department of Tourist Studies at the Faculty of Science and Mathematics in Belgrade, to be abolished in 1991. The reason for this was the reform of the University of Belgrade, as well as the conceptual difference in the understanding of tourism studies from the perspectives of tourist geography and economics. An important role in this was played by the politics of the time and the personal interests of individual professors who were close to ruling structures in Serbia.

In 1992, at the Institute of Geography of the Faculty of Science and Mathematics of the University of Novi Sad, the Department of Tourism was established. The Faculty of Science and Mathematics of the University of Novi Sad was one of the first universities in Serbia to organize its programmes according to the Bologna Convention – since 2002; it was an experimental (pilot) implementation of this model of university education. “A great obstacle to the continuous process of constituting and modernizing teaching was posed by unfair competition among faculties which educated professionals in the area of tourism, especially in the late 1980s, which was somewhat mitigated in the late 2000s. It basically arose from the irreconcilability of two concepts: the ‘commercially economic’ and the ‘integrated or tourismological’.”³ The integrated concept was

2 In 2007, in accordance with the 2005 Law on Higher Education, the schools changed their names to the College of Tourism and the College of Hotel Management, respectively.

3 The expansion of tourism in this part of the world in the 1970s and 1980s, offered a solid ground for the persistence and development of both concepts, i.e. of both education courses. The former concept was exemplified e.g. by the activities of the Faculty of Economics in Belgrade, whereas the latter was represented by the activities of the Department of Tourism Studies, also in Belgrade. Although well accepted in highly developed tourist countries, the integrated concept of tourism was in Serbia suppressed the mid-1980s. This resulted in the abolishing of the above-mentioned Department of Tourism Studies. „The importance of geography in tourism education

temporarily suppressed with the abolishing of the Department of Tourism Studies in Belgrade, but it was also revitalized in a form adjusted to global trends in the 1990s by educating experts in tourism at the Institute of Geography of the Faculty of Science and Mathematics in Novi Sad" (Romelić & Ćurčić, 2012; Romelić & Bjeljic, 2013). Apart from tourist studies, the studies at the Department are diversified and they include four modules: Tourism, Hotel Management, Gastronomy and Hunting Tourism. At the Tourism Module, disciplines related to tourism geography are included in the curriculum as compulsory subjects, whereas in other modules they have the status of elective courses. (Bjeljac, Romelić & Ćurčić, 2015).

In the school year of 2007/2008, a course dedicated to tourism studies was re-established at the Faculty of Geography of the University of Belgrade. Within the study programme Tourism Studies, for the educational profile Graduate Tourismologist, there is a single course designated by the same name – Graduate Tourismologist. In this programme, disciplines related to tourism geography are represented a higher percentage than at the Department of Tourism in Novi Sad. However, having in mind that this is a fairly recently established course and taking into consideration the experience related to the majority of faculties of this type and line of study, it is almost certain that its further development will tend towards creating a balance between the geographical and commercially economic concept because the nature of tourism as a vocation requires this (Popović & Bjeljic, 2007, Bjeljic, 2012; Jovičić et al., 1991, Romelić & Ćurčić, 2012; Štetić, 2012, Bjeljic et al., 2015).

Apart from the mentioned programmes, courses in tourist studies can also be found at the Department of Geography of the Faculty of Science and Mathematics of the University of Niš and the Faculty of Science and Mathematics of in Kosovska Mitrovica (Bjeljac, 2012).

The Geographical Institute Jovan Cvijić SASA has been carrying out significant scientific research in the area of tourism geography since 1998 – at first, in the fields of excursion, weekend and event tourism; in the mid-2000s, the research was expanded to include ecological, cultural, and rural tourism. Accordingly, the Geographical Institute has the potential to become a leading research institution in the area of tourism studies.

is readily highlighted by the fact that even the names of travel destinations, the notions of the tourist season and modes of travel from emissive areas to tourist places, etc. refer to geographical categories or concepts, whose essence is primarily revealed by the use of geographical methodological or methodical aspects" (Tomić & Romelić, 2001, 182).

In 1975, the 25th Congress of the International Association of Scientific Experts in Tourism was held in Belgrade. Beginning in 1996, scholarly conferences dedicated to tourism have been organized in Novi Sad. After the re-establishment of the academic course dedicated to tourism studies, such events have also been organized under the auspices of the Faculty of Geography in Belgrade.

Over time, several textbooks and scholarly monographs have been published in the area of tourism geography and tourism studies. At the same time, the curricula of the undergraduate, Bologna-compliant master's, non-Bologna compliant master's and doctoral studies of tourism were modernized, while tourism studies have developed so as to complement tourism economics, the sociology of tourism, tourist migrations, cultural heritage, etc. (Stanković, 2008). Hence, in 1989, the book *Tourism in Serbia* was published. It was dedicated to the 120th anniversary of the organized development of tourism in Serbia. In 2015, within the scope of the project *The Geography of Serbia* (national monograph), which is being prepared for the press, a prominent place is occupied by the chapter "Tourism in Serbia".

Organizing conferences related to tourism has resulted in the launching of the journal *Turizam (Tourism)*, published by the Department of Geography, Tourism and Hotel Management of the Faculty of Science and Mathematics in Novi Sad. It was launched two decades after the founding of the journal *Turizmologija (Tourismology)*, published by the College of Tourism in Belgrade. Along with these two, a number of journals in Serbia publish papers on various areas of tourism and hotel management as scholarly disciplines, both from the perspective of tourism geography and economics. These are the journals *Hotellink* (College of Hotel Management, Belgrade) and *Turističko poslovanje (Tourism Business)*; College of Tourism, Belgrade). Studies on tourism-related topics are also published in scholarly periodicals published by geographical institutions in Serbia, as well as in a number of reputable international scholarly journals.

CONCLUSION

Only seven years after the first theoretical scholarly study on tourism as a distinct scholarly discipline had been published in the world, Jovan Cvijić realized the importance of this discipline for Serbia and he named it *turistika*. During his field research in the Balkan Peninsula, Cvijić gave numerous descriptions of various regions, highlighted their significance and occasionally drew attention to the state of repair of the then "hotel

and hospitality" accommodation capacity. It is right to say that tourism, as a geographical scholarly discipline that includes both anthropogenic and physico-geographical features (potentials) of a geographic space, was part of anthropogeography at the time when Cvijić conducted his research. Since the 1960s, tourism geography (tourismology) has begun to take shape as a distinct geographical scholarly discipline studied at the Department of Geography at the Faculty of Science and Mathematics in Belgrade and the College of Tourism in Belgrade. In the 1980s (when the Department of Tourism Studies was abolished due to political pressure, implemented through the reforms of the University of Belgrade), there arose a 'conflict' between two concept of research (tourismological vs. economic and commercial). The nature of the conflict was such that the tourismological concept was almost abandoned by the end of the 20th century. However, in the mid-1990s, when an academic course dedicated to tourism studies was introduced at the Institute of Geography of the Faculty of Science and Mathematics in Novi Sad, the tourismological concept was once again strengthened, leading to the re-establishment of the Institute of Tourism Studies at the Faculty of Geography in Belgrade, the establishment of the Department of Tourism Studies at the institutes of geography at the faculties of science and mathematics in Niš and Kosovska Mitrovica and significant scholarly research in the area of tourism within the Department of Social Geography of the Geographical Institute Jovan Cvijić SASA. The conflict persisted in an intense form until the first decade of 2000s, when the economists who had advocated the economic and commercial concept began to gradually realize that tourism was a multidisciplinary scholarly discipline and that the two concepts were mutually dependent. Certain problems still arise from the fact that tourism, as a scholarly discipline (regardless of whether it is seen from the perspective of tourist geography or from the standpoint of the economic and commercial concept), numerous state institutions, representatives of other scientific disciplines, the media, the responsible departments in the Ministry of Education, Science and Technological Development, the Ministry of Culture and Media, and even the Serbian Academy of Sciences and Arts, do not substantially recognize it as a scholarly discipline.

Since 1912 onwards, tourism geography (tourismology) has passed a long way of development and was almost abandoned. However, it has survived and has developed into a respectable scholarly discipline. The directions for the further development of tourism studies include multidisciplinary research involving disciplines such as economics, ethnology, sociology, cultural studies, art history.

Since the 1960s, the Department of Tourism in Novi Sad has educated a large number of professionals, some of whom have achieved significant results in the tourism industry, not only in Serbia but also in the SFR Yugoslavia. The scholars and professors who have maintained the tourismological concept include Dr. Stevan M. Stanković, Dr. Živadin Jovičić, Dr. Snežana Štetić, Dr. Đorđe Čomić, and Dr. Jovan Romelić. However, a group of their students who have been striving to maintain the concept in the 21st century and who have undertaken major interdisciplinary research shall also be mentioned: Dr. Dobrica Jovičić, Dr. Željko Bjeljac and Nevena Ćurčić.

From a linguistic point of view, it is noteworthy that the concept *turistika* (*Turistica*) is still in use in Slovenia, Slovakia and Croatia, more than 100 years since Cvijić first used the term.

ACKNOWLEDGMENT: The study is part of research carried out under the projects 47007III and 47027III, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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SOCIAL GEOGRAPHIC RESEARCH IN AP VOJVODINA (SERBIA) FROM JOVAN CVIJIĆ TO DATE

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ABSTRACT: At the annual conference of the Matica Srpska in 1922, Jovan Cvijić stressed the importance of scientific research work of this institution and the need for further, more systematic scientific study. On that occasion he emphasized the importance of fundamental geographic research of Vojvodina. Significant social geographic research of Vojvodina started from the 50's of the 20th century, first by the Matica Srpska, and from the 60s by the Department of Geography at the Faculty of Sciences in Novi Sad. The originator of geographical research in Vojvodina (north part of Serbia) was academician B. Bukurov who based his scientific work on Cvijić's scientific approach to human geography (particularly accepting the research relating to the origin of the population and settlements in Vojvodina; later, his students took over that scientific approach, including subsequent assistants and university professors D. Bugarski, N. Carić, S. Ćurčić). Their scientific, and also university teaching work influenced modern development of several social and geographical disciplines (regional geography, population and settlement geography, tourism geography, demography) and the development of faculty who mostly continued the research activities. Major projects and research in which social geographers have a significant contribution include: Colonization in Vojvodina, Settlements and Population, Geography of Vojvodina, Regional Atlas of Vojvodina, The Demographic Transition in Serbia, The Possibility of the Development of Cultural Tourism in Vojvodina, etc. The subject of the paper is the analysis of previous studies from academician Bukurov to date, in order to establish their influence on contemporary geographical research.

Key words: Jovan Cvijić, Branislav Bukurov, social geographic research, Vojvodina

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INTRODUCTION

The development of geographical science in the geospace of Vojvodina (north part of Serbia) may be considered in four periods: the Austro-Hungarian Empire, Kingdom of Yugoslavia, the Socialist Federal Republic of Yugoslavia and the period after the disintegration of Yugoslavia. Geographical science on the territory of Vojvodina started to be studied in the 18th century, but it had mainly descriptive character (geography). "In the 18th century already, Vojvodina had a developed middle class and educated people abroad" (Bukurov, 1977, 40). From their high schools in Prague, Moscow, Vienna, etc., they passed on modern scientific methods, and the first scientific papers were descriptive. In the social geography research of that time philosophers, historians, theologians, teachers and others were mainly engaged. Archimandrite Pavao Kengelac¹ was one of the first major people involved in this type of the research. In 1811. he wrote a nature study *Jestestvoslovije* (Bukurov, 1976; www.riznicasrpske.net). In this book, seven chapters were about physical geographical features, and the chapter eight about man. In this chapter, in addition to theological aspects Kengelac wrote about some economic geographical features in Banat and the Romanian-Serbian part of the Danube Region (Vuca, 2011). During this period and until the disintegration of the Austro-Hungarian monarchy, "a very significant action was the writing of geographical and historical monographs of the former counties". This territory included the counties of Srem, Bač-Bodrož, Torontal, Čongrad Karaš-Severin and Tamiš. These were the first detailed geographical studies from Vojvodina (Ćurčić & Bugarski, 1996).

In the period between the two world wars, the social geographic research in Vojvodina was generally conducted to a lesser extent, spontaneously, as part of a regional geographic research. The choice of topics was largely dependent on the affinity of the researcher. Poor organization of the new state (Kingdom of Serbs, Croats and Slovenes / Yugoslavia), inadequate and inefficient statistical service, censuses with unclear demographic indicators, influenced to explore the geospatial area of Vojvodina (the former northern part of the Danube Banovina) from the social and geographic aspects (Ćurčić & Bugarski, 1996; Bukurov, 1976). During this period the works of Branislav Bukurov stand out: *Ada* (Ada) (1931) and *Consequences of Migrations in the North-Western Potisje* ("Posledice migracije u severozapadnom Potisju"), (1939) (www.velikanisrbije.com).

1 (Kikinda 1770– Monastery of St. George Romania 1834) studied seminary, history and natural sciences in St. Petersburg (Russia) and Halle (Germany).

The neglect of geographic explorations in the territory of Vojvodina was also noted by Jovan Cvijić. As a result, at the annual conference of the Matica Srpska held on 14 January 1922, in his speech, among others, he singled out the importance of geographic research of this area. As priorities in the social and geographical (anthropogeographical) research, he singled out the following: the research of links between the types of settlements and population groups, as well as the settlements and the different types of relief, determining the origin of the population as a very important factor for the solution of ethnographic, anthropogeographical and sociological problems,² ethnographic research (folklore and customs). He also stated that in addition to field research (methods of writing and describing, collecting and studying archive materials), a method of collecting and studying subjects in ethnographic museums should also be introduced and thus enrich their collections to be not only archaeological ones, but to have collections of movable and immovable cultural heritage of the Slavic population and others). He pointed out that the Matica Srpska should be the holder of such work. He suggested to find three or four men for such scientific work, and to achieve this he proposed that these people should be from Novi Sad (Vasović, 1994, 282–284).

By the end of World War II a new period of development of geographical science began (and thus social geographic disciplines) in the territory of Vojvodina. Unlike the previous, uncontrolled period, it began with the planning studies. The Matica Srpska launched the initiative, organizing and finding collaborators who were from Yugoslavia and who explored the geospace of Vojvodina (north part of Serbia). In addition to the Matica Srpska, this research also included institutionally the Serbian Geographical Society, the Serbian Academy of Sciences and Arts, the Museum of Vojvodina, the Faculty of Philosophy, the Faculty of Sciences, University of Novi Sad and Belgrade (Bukurov, 1976). During this period the research continued according to the suggestions of Jovan Cvijić given in 1922. Since the 60s of the 20th century to the present day, a few different directions of research appeared, some new scientific social geographic disciplines were formed, and the number of quality scientific staff researchers increased. All these have affected the substantial, detailed and complex multidisciplinary social geographic research of geospace of Vojvodina.

2 He stressed that this research should be led by different methodology than the studies that have been conducted south of the Sava and Danube rivers.

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Anthropogeography, as one of the directions, represents a continuation of Cvijić's geographical research school, "which becomes recognisable in the world by the appreciation of the historical development, economic and social variables of geospace" (Spasovski & Šantić, 2013, 2). "From 1896. until 1922. Jovan Cvijić wrote and published five extensive guidelines for investigating the origin of the population, its ethno-psychological characteristics and the settlements" (Vasović, 1994, 152). By the late 90s of the 19th century, Cvijić's geographical school announced the research of anthropogeographical and ethnographic characteristics of the people in the Balkans. Principal investigators were geographers, as well as "intelligent people in the nation (teachers, priests, students, traders, etc.)". From 1902, a special edition *Settlements* was published by SASA. Until the Second World War, only Bačka, Banat and Baranja were registered as unexamined areas (Cvijić, 1987, 301) in Serbia.

In 1955, together with members of the scientific committee of the Matica Srpska, the *Guidelines for the Study of the Vojvodina Settlements* ("Uputstvo za istraživanje vojvođanskih naselja") were compiled (Bukurov, Nikolić & Vranešević). The guidelines were based on Cvijić's Instructions, modified for Vojvodina area. They include:

- *geographical-ethnological* part
- geographical description of the environment (relief, climate, hydrography, flora and fauna)
- population (population, natural increase, artificial growth-migrations, immigrant origin, natives)
- economic conditions (occupation of the inhabitants, agriculture, crafts, industry, migrant work, tourism)
- trade and transportation
- settlement (location, construction conditions, type, economic character, cultural, educational and political role, past and topographical development)
- house (location, type, temporary and permanent field apartments)
- folk life and customs (domestic life, food, costumes, social life, customs, superstitions, sorcery, folk parties and games, folk knowledge)

- historical part³ (the original community, slave society, feudal, capitalist, first world war, the period between the two world wars, the nations of Vojvodina in World War II)

Results based on the research according to the Guidelines were published as separate monographs, scientific articles in scientific periodicals, like the Matica Srpska (part of the research is also in manuscript department of the Matica Srpska)⁴, the Institute of Geography in Novi Sad, the Geographical Institute "Jovan Cvijić" SASA, Ethnographic Institute SASA, other publications of the SASA, Bulletin of the Serbian Geographical Society, etc. The Matica Srpska "conducted studies of the Vojvodina villages and cities, the pre-war and post-war migrations (great importance is given to aspects of research of adaptations of colonists to the new environment), Fruška Gora, the Vršac Mountains, etc (as complex research of characteristic regions in Vojvodina)" (Bukurov, 1977, 42; Ćurčić & Bugarski, 1996, 52). Within the Geographical Institute SASA, as part of the "general plan of the study of the Danube Basin, the Bačka and Banat part of the Danube region and Fruška Gora were comprised in Vojvodina" (Bukurov, 1977, 42). The Ethnographic Institute SASA conducted studies of colonization after the Second World War.

These studies in these institutions were done from anthropogeographical, ethnographic and historical and geographical points of view (among others, academician M. Lutovac, B. Ž. Milojević, N. Gaćeša, V. Djurić, M. Barjaktarević, J. Trifunoski, M. Vasović, etc.).

The following papers stand out:

Nikola Gaćeša: *Agrarian Reform and Colonization in Bačka, 1918–1941* ("Agrarna reforma i kolonizacija u Bačkoj 1918–1941"), (1968); *Agrarian Reform and Colonization in Banat, 1919 – 1941* ("Agrarna reforma i kolonizacija u Banatu 1918–1941"), (1972); *Agrarian Reform and Colonization in Srem, 1918–1941*, ("Agrarna reforma i kolonizacija u Sremu 1918–1941.") (1975); *Agrarian Reform and Colonization in Yugoslavia 1945–1948* ("Agrarna reforma i kolonizacija u Jugoslaviji 1945–1948").

In the early post war years, *Branislav Bukurov* stood out as one of the most important geographers-researchers of geospace of Vojvodina⁵. Dur-

3 In general notes it is advised that researchers who treat historical part should consult with geographers, historians, archive, museum and archaeological experts, as well as to get acquainted with existing archival and other historical material and to carefully treat historical material of all the peoples in Vojvodina.

4 Unpublished papers, files with the processed or unprocessed surveys.

5 Ostojićevo 1909 - Novi Sad 1986. He studied anthropogeography at the Faculty of

ing his studies in Belgrade, and later, his professor Borivoje Ž. Milojević has continued Cvijić's practice of encouraging youth to scientific work. Bukurov was given concrete tasks of geographical studies of Vojvodina (Ćurčić & Bugarski, 1996). As a teacher and as a scholar, he continued this Cvijić's practice and formed a significant number of teaching and research personnel in the territory of Vojvodina. Like most geographers of the period he dealt with the issues of social geography. Combining these two geographical disciplines, he gave his contribution to the development of regional geography (www.branislav-bukurov.com; Ćurčić, 2012). The scientific contribution in social geography is expressed through two lines of research. The first line of research gives scientific bases of economic - traffic geography, through the analysis of the functioning of natural and social factors in a certain area, their connections and mutual influences in the development process. The second one gives a large number of important studies of the Vojvodina population and rural and urban settlements of Vojvodina.

The papers that have contributed to the later development of these disciplines are: *Great Danube – Tisa – Danube Canal* ("Veliki kanal Dunav – Tisa – Dunav", 1949), *Economic - Geographical Conditions and Transport Links of the Fruška Gora Area* ("Privredno - geografske prilike i saobraćajne veze fruškogorske oblasti", 1951); *Share and Place of Vojvodina in Crop Production of Yugoslavia* ("Udeo i mesto Vojvodine u ratarskoj proizvodnji Jugoslavije", 1956); *Gravitational Spheres of the Vojvodina Towns* ("avitacione sfere vojvođanskih gradova", 1970), *The Geographical Bases of Rail Transport in Bačka* („Geografske osnove željezničkog saobraćaja u Bačkoj", 1972); *Alluvial Plains as a Living Space on the Territory of Vojvodina* ("Aluvijalne ravni kao životni prostor na teritoriji Vojvodine", 1975); *Origin of the Population of Vojvodina* ("Poreklo stanovništva Vojvodine", 1957) (Settling in the territory of Vojvodina after the Second World War was studied. The demographic characteristics and structures of migrants were studied and the migration balance of all republics of Yugoslavia were calculated and presented. Data on distribution of settlers in Vojvodina districts and cities are very useful, as well as their percentage in the total population and an overview of the population of Vojvodina in the republics of birth and their ethnic composition). There are also papers such as *The Influence of the Geographic Environment on the Newly Arrived Population of Vojvodina* ("Uticaj geografske sredine na novodoseljeno stanovništvo Vojvodine", 1961); *Colonisation of*

Philosophy in Belgrade. Since 1968, member of SASA (<http://www.branislav-bukurov.com/akademik>). He worked in the College of Education, the founder of the Department of Geography at the Faculty of Philosophy. He was also vice president of the Matica Srpska (Ćurčić & Bugarski, 1996).

Bačka During the Second World War (Kolonizacija Bačke za vreme Drugog svetskog rata", 1971), *External Migrations of Peoples of Yugoslavia Between the Two World Wars* ("Spoljašnje migracije naroda Jugoslavije između dva svetska rata", 1976); *The Ethnic Structure of Workers Who Are Temporarily Working Abroad* ("Etnička struktura radnika koji su privremenom radu u inostranstvu", 1976) and many others (Ćurčić, 2012).

In 1962 with a group of associates he formed the Department of Geography at the Faculty of Philosophy in Novi Sad. From July 1969, the Department became part of the newly established Faculty of Sciences in Novi Sad. In this way he established not only the opportunity to study geography in Vojvodina and higher education for young geographic experts, but also the systematic scientific studies of all segments of geospace. By this time Vojvodina was very poorly studied from the geographical aspect. Thanks to the research of academician Bukurov and associates, Vojvodina became the most studied part of Yugoslavia (Carić, 1996). His collaborators and successors in the later period deepened the research of Vojvodina through specializations in specific geographical disciplines, which brought about fundamental studies through the scientific projects and numerous scientific and professional works published in the country and abroad. Almost during the 70s and onwards, the Institute for Geography of the Faculty of Sciences in Novi Sad with the Matica Srpska stood out as a centre of scientific research of Vojvodina. At the end of the 80s of the 20th century, the project *Geographic Monographs of Vojvodina Municipalities* was initiated at the Institute of Geography in Novi Sad, under the leadership of Branislav Bukurov. He initiated the project of the *Matica Srpska Settlements and Population of Vojvodina*. These are the projects that still last (Carić, 1996).

In addition to academician Bukurov, a significant contribution to the development of social geography in the observed period was given by a number of his colleagues and students. *Nebojša Carić*⁶ stands out as one of the closest associates of Bukurov. He made special contribution to the development of population geography, theoretical and methodological bases of research (he also dealt with the theoretical concepts of development of social geography, and except scientific works, at the Institute of Geography he gave lectures on "the contemporary problems of social geography"). He was one of the first geographers in Yugoslavia who used computer technology of that time in his research regarding the popula-

6 Novi Sad 1925 – Novi Sad 2006. He studied geography at the Department of Geography, Faculty of Sciences in Belgrade. With Branislav Bukurov and PhD Jovan Petrović he was one of the first three professors who were employed full-time at the Department of Geography at the Faculty of Philosophy in Novi Sad.

tion. He was also one of the teachers who took care of the future young scientific staff, through subjects "Introduction to independent work" and "The development of geographical thought".

Papers that have contributed to the development of human geography are: *Material and Social Aspect of the Functioning of Anthropogenic Factors of Accelerated Soil Erosion* ("Materijalni i socijalni aspekt delovanja antropogenih faktora ubrzane erozije tla", 1966); *An Understanding of Settlement Geography* ("Jedno shvatanje o geografiji naselja", 1973); *What is Controversial in Population Geography* ("Šta je sporno u geografiji stanovništva", 1974), *On Basic Determining Factors of the Disposition, Physical Structure and the Transformation of Urban Settlements* ("O osnovnim određujućim faktorima razmeštaja, fizičke strukture i transformacije gradskih naselja", 1975), *Law of Integral Geographic Environment and Regional Planning* ("Zakon integralnosti geografske sredine i regionalno prostorno planiranje", 1979.), *Mathematical Population Projections of Novi Sad Region from 31 March 1981 to 31 March 2001* ("Matematičke projekcije stanovništva novosadskog regiona od 31. marta 1981. do 31. marta 2001.", 1983); *Analytical Method of Predicting the Number and Gender and Age Structure of the Population* ("Analitički metod prognoze broja i polno-starosne strukture stanovništva", 1984); *Research on Social Geography* ("Istraživanja u društvenoj geografiji", 1987), *Development of Geographical Science* ("Razvoj geografske nauke" 1989), *Some Aspects of Demographic and Economic Analysis of the Population* ("Neki aspekti demografske i ekonomske analize stanovništva", 1990), *Demographic Trends in SAP Vojvodina and the Novi Sad Region until the Beginning of the XXI century* ("Демографска кретања у САП Војводини и новосадском региону до почетка XXI века", 1985).

*Dragoljub Bugarski*⁷ also stands out. He dealt with physical (climatology), regional geography, but also contributed to the social geography. He is the first scientist from the territory of Vojvodina who received a Master's degree in tourism, and has published a series of papers from that field, and is the originator of tourism geography (tourismology) in Vojvodina. He studied the population and settlements in Banat (Ćurčić, 2003). Important works that have contributed to the development of human geography in the observed period are: *Hunting Tourism in Vojvodina* ("Lovni turizam u Vojvodini", 1972), *Modern Functions of Kikinda and its Gravitational Area* ("Savremene funkcije Kikinde i njeno gravitaciono područje", 1980), *Basic Demographic Problems of Bordering Municipalities in Banat* ("Osnovni demo-

7 Ostojićevo 1937–Novi Sad 2012. He studied geography at the Department of Geography, Faculty of Sciences in Belgrade. He was the first assistant professor at the Institute of Geography of the Faculty of Sciences.

grafski problemi pograničnih opština u Banatu", 1987), *Basic Demographic Problems of Bordering Municipalities in Bačka* ("Osnovni demografski problemi pograničnih opština u Bačkoj", 1988).

Slobodan Ćurčić⁸ is the originator of modern scientific study of settlement geography and initiator of cartography as applied geographic science in Vojvodina, as well as spatial planning from geographical aspect (Djurđjević, 2008). As Jovan Cvijić did, he often used fieldwork with students in his research. In the observed period, significant works that have influenced the development of social geography in Vojvodina are: *Population of Fruška Gora Region* ("Stanovništvo fruškogorske oblasti", 1980), *The Natural Conditions for the Construction of Tourist Villages on Fruška Gora* ("Prirodne pogodnosti za izgradnju turističkih naselja na Fruškoj gori", 1974), *Change in Population of Vojvodina During the Last Hundred Years* ("Promena broja stanovnika Vojvodine tokom poslednjih sto godina", 1979), *A Contribution to Delimitation of Rural and Urban Settlements* ("Prilog razgraničenju seoskih i gradskih naselja", 1980); *The Process of Secondary Urbanization in Vojvodina* ("Proces sekundarne urbanizacije u Vojvodini", 1985), *Migrations and Demographic Polarity in Vojvodina* ("Migracije i demografski polaritet u Vojvodini", 1987), *Problems of Morphological Typology of Settlements* ("Problemi morfološke tipologije naselja", 1987). In 1986, a book was published titled *Migration Movements in Vojvodina Villages* as a special edition of the Institute of Agricultural Economics of the Faculty of Agriculture in Novi Sad, as a result of the same project which was managed by Slobodan Ćurčić.

During this period, a large number of monographs on villages and municipalities in Vojvodina were also published, including historical and geographical research. They were published as separate publications financed by individuals or municipalities and mainly printed as part of the celebration of the major jubilees from the history of these settlements.

SOCIAL GEOGRAPHIC RESEARCH ON THE TERRITORY OF VOJVODINA

since the 90s of the 20th Century to the Present Day

During the 90s of the 20th century, besides the above mentioned scientists, their students appear as researchers, and later, university professors and scientists who have contributed to the further development of social and regional geography.

8 Novi Sad 1941– graduated in Geography at the Department of Geography of the Faculty of Sciences. With Dragoljub Bugarski, he was assistant professor to professors Bukurov, Carić and J. Petrović. He was also the Vice President of the Matica Srpska.

In the 80s of the 20th century already, it is moved from anthropogeographical direction of study to the specialised geographic disciplines. The Matica Srpska and the Institute of Geography of the Faculty of Sciences in Novi Sad are still the bearers of scientific research of geospace of Vojvodina from the social geographical aspect. The Matica Srpska continues with the project Settlements and Population of Vojvodina⁹, and the Institute of Geography with the project Geographic Monographs of Vojvodina Municipalities (in the '90s the name was changed to Regional Geographical Studies of Vojvodina).

Within such a large research, all larger municipalities in Vojvodina were treated geographically and printed in about 40 monographs. According to the scope of research in particular can be singled out the monographs done for the municipalities of Bačka Palanka, Bečej, Pančevo, Kikinda, Sremska Mitrovica. Special importance is given to research of the municipality of Novi Sad for which the monograph was done in three volumes. Each monograph contains all the essential elements of the geographic representation, such as location, natural and geographic characteristics, social-geographical characteristics. Social geographical characteristics were treated through the studies of population, settlements and economy of a given area, i.e. municipality. Thus, condition, problems and future processes related to population, settlements and economy of municipalities had analytical and synthesis treatment. In the tables, graphs and maps the obtained data were visually presented and thus became more easily comprehensible, giving quality in reading, understanding and interpretation of the data obtained.

The project "Regional Geographical Studies of Vojvodina" builds on the previous project "Geographic Monograph of Vojvodina Municipalities" and is a continuation of the research of Vojvodina geospace, that is, modernization and actualization of the contents previously treated in monographs of municipalities. The research results were published in a series of monographs of certain regions – Srem, Bačka and Banat. The monographs dealing with social and geographical characteristics of Vojvodina are the following: The Population of Srem, The Settlements of Srem, Economy of Srem I and II, The Population of Banat, The Settlements of Banat, Economy of Banat, The Population of Bačka, The Settlements of Bačka, Economy of Bačka.

During the 90's of the 20th century, a wider regional scientific cooperation of social geographic research begins (demographic, regional-ge-

9 Unlike earlier period geographers gain significant share in these studies.

ographic, urban geography, tourism geography). In the period from 1994 to 1997 the Department of Geography at Western University of Timisoara initiated a regional study entitled "Geographical Research of the Carpathian-Danube Area". Geographers from Novi Sad and Szeged accepted this initiative and organized their own conferences about border regions. Later, the research focused on parallel research of Banat, common historical province of Romania, Yugoslavia and Hungary, and the final conference held in 1998 in Timisoara was dedicated to emergence of a new Euroregion (Danube-Kriš-Mureš-Tisa Euroregion) (Đurđev, 1998). All research are published in a joint monograph, and the social-geographical research of Yugoslav part of Banat dealt with the deployment and organization of industry, the refugees, the regional distribution of settlements, urban and demographic development, changes in activities of Banat population, the importance of transport connectivity and others. The general assessment was that neighbouring regions have territorial cohesion and certain forms of regional cooperation, but modernized forms of cooperation should also be developed in the future. Later, these studies had a practical use in the framework of cross-border cooperation of the European Union.

Professor Ćurčić published three books issued by Matica Srpska, arising from the work on the project "Regional Atlas of Vojvodina" which he directed: Population of Vojvodina (1996), The Biological Structure of the Population of Vojvodina – Gender (2005), The Biological Structure of the Population of Vojvodina – Age (2005). Also, within the project of the Department of Social Sciences of the Matica Srpska "Settlements and Population of Vojvodina" he published the following books: Settlements of Srem – Geographical Characteristics (2001), Settlements of Banat – Geographical Characteristics (2004), Settlements of Bačka – Geographical Characteristics (2007), Settlements of Vojvodina – Geographical Characteristics (Đurđev, 2008).

In addition to significant projects implemented during the 1980s and 1990s of the 20th century, the socio-geographical studies of Vojvodina continued into the 21st century by a series of four-year, two-year or one-year projects under the auspices of the competent Republic Ministry of Science, Provincial Secretariat for Science and Technological Development of AP Vojvodina, or the Matica Srpska. They have explored some of the most current geographic problems, such as reducing population growth, migration, depopulation, aging of the population, colonization, problems of refugees, small settlements in the degradation, the problems of border settlements, etc. These include the following projects (45 years of the Faculty of Science 1969–2014, 2014): *Geographic Aspects of State and Devel-*

opment of Serbia (Vojvodina) (2001–2005); Demographic Transitions in Serbia (from 2006 to 2010); Population and Settlements of Vojvodina (from 2010 to 2012); Facing the Challenges of Depopulation in Vojvodina (2011–2014); The Demographic Problems of Smaller Ethnic Groups in Vojvodina (2013). In the 21st century, the international scientific community is also aware of the social and geographical research in geospace of Vojvodina by publishing a series of scientific papers in reputable international scientific journals.

During the 90s of the 20th century, a more significant research began of contemporary migration processes, and new approaches to research of colonization in Vojvodina after the First and Second World War. In addition to the Matica Srpska and Department of Geography, Tourism and Hotel Management of the Faculty of Sciences, Novi Sad, the Institute of Social Sciences - Centre for Demographic Studies, Belgrade also stands out. The following papers can be singled out: B. Đurđev *Postwar Colonization of Vojvodina: Methods and Results of Demographic Analysis of Colonization of Vojvodina in the period 1945–1985* ("Posleratno naseljavanje Vojvodine: Metodi i rezultati demografske analize Kolonizacije u Vojvodini u periodu 1945–1985. godine", 1995); S. Ćurčić *One Little Known Mass Migration in Vojvodina* ("Jedna malo poznata masovna migracija u Vojvodini", 1996) (the paper is about economic migrations of population from the 50's to the 80's of the 20th century, which are a kind of continuation of colonization 1945–1948); V. Nikitović, V. Lukić, "Could Refugees Have a Significant Impact on the Future Demographic Change of Serbia" (the paper is about the impact of refugees from the former Yugoslavia in the period 1992–1995 on the future demographic changes in Serbia).

In the second decade of the 21st century, one of the capital projects of the Matica Srpska is "Atlas of Settlements of Vojvodina". In 2013 the first of three books was published in which all the settlements of Srem were treated. In addition to Slobodan Ćurčić and the Department, its authors are also experts from the Military Geographical Institute, Belgrade, and the Geographical Institute "Jovan Cvijić" SASA. The settlements are represented by contemporary maps of the Military Geographical Institute, as well as historical ones from Ptolemy, Roman itinerary "Tabula Peutingeriana", through maps made by Lazarus Rozetus, Luigi Fernando Marsili, Alexis Hubert and other cartographers, so that the development of the settlements can be traced through history. Demographic data are based on the census from 1787 to 2002. Each place is also presented by the text which contains a historical overview of its creation until today, and is enriched with vivid details from the life of the settlements of Srem. The second book is Atlas of Settlements of Banat, 2014. The description

of settlements in Banat is supported by maps, the earliest of which date back to 1780, as well as the demographic picture of the population, the development of urban areas and topographic changes. The settlements and their inhabitants are presented and described on the basis of natural and social conditions, wars, many migrations, and all data are presented in a way that is adapted to every reader. Atlas of Settlements of Backa will also come out in the foreseeable future (http://www.kultura.vojvodina.gov.rs/Kalendar/2014/dec/29_dec.htm).

Since the 80s of the 20th century, the ethno-demographic research of national minorities in Vojvodina geospace is also significant. Particularly important are the research of Saša Kicošev, Tamara Lukić (Department of Geography, Tourism and Hotel Management, Faculty of Sciences, Novi Sad) and Biljana Sikimić (Institute for Balkan Studies SASA). The following papers can be singled out: N.Carić: *Changes in Average Age of National Minorities and Serbs in Vojvodina for the Period 1971–1991* (1999) S.Kicošev: *Geographic and demographic characteristics of the Romanian nationalities in Vojvodina*, ("Geografske i demografske karakteristike rumunske narodnosti u AP Vojvodini", 1991); *Some geographic and demographic characteristics of Vojvodina Ruthenians and Ukrainians* ("Neke geografske i demografske karakteristike vojvođanskih Rusina i Ukrajinaca", 1996) *Census-statistical indicators of changes in the number and territorial distribution of Vojvodina Hungarians in the 20th century*, ("Popisno-statistički pokazatelji promena brojnosti i teritorijalne distribucije vojvođanskih Mađara, tokom 20. veka", 2000), T.Lukić at al: *Age structure of gypsies in Vojvodina (2005)*; *Age-sex structure of Slovenians in Vojvodina in the second half of 20th and on the beginning of 21st century* (2005); *Montenegrins in Vojvodina Province, Serbia* (2014); *Turks in Vojvodina (Serbia), in The Second Half of The 20th Century and on The Beginning of The 21st Century* (2014).

Within tourismological research of geospace of Vojvodina, since the beginning of the 21st century, cultural tourism stands out among others, which largely includes research in the fields of ethnology, demography, regional geography and settlement geography, and thus the development concept of cultural geography begins as a direction of social geographic research of Vojvodina. Some interesting projects are: *Folklore and heritage tourism in Banat* (2006); *Folklore and heritage tourism in Bačka* (2006–2007); *Folklore and heritage tourism in Srem* (2008).

In this regard, in the second decade of the 21st century, the Geographical Institute "Jovan Cvijić" SASA, Belgrade stands out as one of the institutions engaged in the research in these areas in addition to the Department for Geography Tourism and Hotel Industry, Novi Sad (Acade-

mician Olga Hadžić, Jovan Romelić, Nevena Ćurčić, Andjelija Ivkov-Džigurski, Željko Bjeljac, Aleksandra Terzić). The following papers can be singled out: akademik O. Hadžić: *Cultural tourism* ("Kulturni turizam", 2004); Ž. Bjeljac, N. Ćurčić: *Ethnographic Events in Vojvodina as Part of Tourist Offer* (2005).

CONCLUSION

From 1922 and Cvijić's guidelines for geographical research of Vojvodina to present day, it can be said that of the least explored area on the territory of the former Yugoslavia, the geospace of Vojvodina has been investigated most detailed. These systematic and complex investigations are still underway. The Department of Social Sciences of the Matica Srpska and Department of Geography, Tourism and Hotel Management of the Faculty of Sciences in Novi Sad are the bearers of the research, but important role have the institutions like the Museum of Vojvodina (Novi Sad), Geographical Institute "Jovan Cvijić" SASA, Ethnographic Institute SASA, Institute for Balkan Studies SASA and others.

Two stages of contemporary research can be singled out - anthropogeographical (up to the 80s of the 20th century) and multidisciplinary, applied research to present day. Also, a very important fact is continuity in the high quality scientific personnel at the Department of Geography, Tourism and Hotel Management, from academician Bukurov to date.

Problems in more qualitative research of Vojvodina in terms of human geography can be viewed from two aspects:

- Financial (since the eighties of the 20th century to the present, not enough funding projects by national and provincial institutions, responsible for science, although some projects are of great importance not only for the geospace of Vojvodina, but also for the whole territory of Serbia)
- The scoring system and the status of human geography (as part of geographical science), which stimulates the quantity at the expense of quality.

ACKNOWLEDGEMENTS: This work is part of research projects 47007III and 47027III funded by the Ministry of Education, Science and Technological Development.

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MIGRATION POTENTIAL OF CITIZENS OF THE JABLANIČKI AND PČINJSKI DISTRICTS

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ABSTRACT: The focus of this paper is the field research of the migration potential of the population of less developed areas of central part of Serbia – the Jablanički and Pčinjski Districts. Field work was carried out in two waves, by the mid of 2010 and mid of 2013. On both occasions statements of citizens were recorded by the survey on representative samples (2010: N=1548, 2013: N=1678). In this paper we intend to present research results referring to the volume of people who consider emigration as an option as well as the volume of those who have already undertaken concrete steps to pursue the plan to move out (so called 'migration potential'). Furthermore, we took into account the influence of various factors of emigration in terms of characteristics of potential migrants (age, gender, place of residence, education, employment, marital and family status). By way of comparative analysis of both waves of field studies we plan to test the influence of significant social and political events at the background of these motives for emigration as well as their practices therewith. Sociological analysis of the contexts of these local communities will help us to try to distinguish the "push" factors of migration from these territories.

Key words: emigration, demographic characteristics, local community, social instability

INTRODUCTION

Dramatic events and bleak processes from 1990s have produced multiple effects on migration movements in the Republic of Serbia. Immediately after the breakdown of the common state, SFRY, followed by sanguineous disruption, there occurred massive movements of refugees coming to Serbia from the neighboring, newly independent states (ex Yu republics)¹. At the

1 This paper is a result of the work of both authors on the project "Izazovi nove društvene integracije – koncepti i akteri", ('Challenges of new social integration – concepts and actors') conducted under the auspices of the Institute for sociological research,

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very beginning, ever since 1991, they were arriving from Croatia, and then in 1992 they were accompanied by refugees from Bosnia and Herzegovina. Vast majority of them had moved to Serbia at the onset of armed conflicts while later on their immigration was mostly periodic, i.e. along their fleeing from local places of residence. These movements were relatively frequent up to the signing of Dayton Agreement in Paris, by the end of 1995. Most of refugees settled in regions of: Vojvodina, Belgrade and western Serbia, while minor moved towards Eastern and Southern parts of the Republic. However latter regions were not completely saved from arrivals of forced migrants. To the contrary, during the bombing campaign which took place in Kosovo in 1999 and later throughout 2000s along armed conflicts instigated by major separatist Albanians against local non-Albanians, many families, mostly Serbs' had left their hearths and moved to the counties of the southern Serbia, Šumadija and Raška.

While forced immigration produced an increase of population in municipalities where refugees and IDPs from Kosovo and Metohija (internally displaced persons) had settled, at the same time a massive emigration of working age and young people had been instigated. They searched for better opportunities in developed Western countries because of the decline in living conditions at home. They were partly joined by forced migrants, who also deemed Western countries as more attractive destination for further movements compared to devastated Serbia' society and economy. Those were again younger and working age persons ready for fast adjustment to new working and living settings. Thus it can be assumed that although last decades of the 20th century brought about an increase of total population of Serbia (without Kosovo and Metohija) due to massive immigration, the issue is that concomitant socio-political processes caused a salient worsening of its demographic profile. The emigration of youth had an effect of shrinking of working age population, stark depopulation trends and rapid ageing².

This intertwining of emigration and immigration has resumed in the new millennium as well. The revival of hope for fast recovery after the political turnover in Serbia on October 5th, 2000, motivated some of our countrymen to return and establish themselves at the homeland. Besides them there were also returnees who had been arriving to the country after

Faculty of Philosophy, University of Belgrade, 2011–2015, and supported by Ministry of Education, Science and Technological Development of the Republic of Serbia (No. 179035).

2 Figures for Serbia will exclude the territory of Kosovo and Metohija, due to the lack of official data for the southern province.

2008, i.e. due to the onset of world economic crisis. The latter caused the various sorts of cuts in developed countries which were reflected *inter alia* in layoffs of significant portions of immigrants. Furthermore, important volume of immigration to Serbia stemmed from stocks of returnees on the basis of Readmission Treaty signed with EU. Finally, there had also been increasing numbers of foreign citizens from eastern countries, Africa, Middle East, etc, for whom Serbia had become a transit place on their movements to the West and thus they had stayed here shortly. Based on all above mentioned we can assume that Serbia has been becoming emigration, immigration and transit territory. It should however be taken into account that vast majority of returnees had very shortly become disappointed in new and promising regime and living standard in the homeland and therefore many had decided to leave it again, especially youth and labor force, i.e. those who were in life course when an adaptation to shifts in settings is less harmful and smoother.

Lower quality of life compared to the one in ex-SFRY and in developed western states continually inspires our countrymen to undertake steps to emigrate. Additionally if we have in mind foreign programs and various fellowships targeted to brain drain, which are even intensified in the global 'struggle for talents', we can get to better understand that trends of emigration of young and educated population are actually permanent.

The main goal of this paper is to present empirical findings on migration potential of two less developed parts of Serbia – Jablanički and Pčinjski counties, on the basis on field results collected through survey researches. Furthermore, we will try to lay ground for creating a profile of potential emigrants as well as to disclose problems of these counties owing to respondents' statements, thus to sketch 'push factors'. Bearing in mind that these regions are also sources of massive inter country movements (internal migration), our analysis will therefore not be restricted only to potential external migrants but will also incorporate all those who are considering leaving their place of residence irrespectively of desired destinations.

In the first part of the text we shall explain the method of data collection, as well as the overall theoretical approach and context of our analysis. In the second part we will demonstrate migration potential quantitatively including also comparative analysis of data gathered in the two time slots. The third part is reserved for the analysis of demographic characteristics of potential migrants, and the final one for the presentation of the problems respondents face which we have denoted as "push" factors.

Methodological and contextual acknowledgements

It should be highlighted that these two counties belong to the southern region of Serbia with relatively high emigration stocks and rates. Latter has been acknowledged in analysis of censuses 2002 and 2011 (Stanković, 2014). According to the last census, there is a highest number of emigrants and their family members coming from the south and east of Serbia (53.9% and 38.6% respectively) (Stanković, 2014: 30)³. Furthermore emigrants from these two regions have spent the longest time abroad (11.8 years), (ibid: 37).

Our analysis will nonetheless be grounded on the data gathered together through surveys at the territories of two counties from the south - Jablanički and Pčinjski in two waves: the first one by the end of 2010 and the second one in March 2013. The empirical field studies were undertaken by the NGO CESID (Center for liberal elections and democracy, Belgrade) and were commissioned by the joint projects of UN, PBILD, "Strengthening of the capacities for inclusive development in the southern part of Serbia" and "Promotion of peace building in the southern part of Serbia". These empirical endeavors had *three* main aims: firstly, to estimate migratory potential of the citizens in these two counties, then to recognize the position of young population up to 29 years of age, and thirdly, to investigate multiethnic relations in these two counties already known as highly mixed in terms of ethnic composition⁴. The rationale for the repetition of the research was found in unfolding of socio-political events by the end of 2012 and at the beginning of 2013. They were deemed important since

3 This is especially true for the eastern part of the country, but emigration trends are not in the focus of our paper. Instead here we are analyzing empirical findings on migration potential of the selected counties.

4 Multiethnic composition of the territory is not the single reason that asks for the research of interethnic relations and engagement of teams for mediation at these territories. The true is that relationships in between Serbs and Albanians living in the southern Serbian province, Kosovo and Metohija, were burdened by many decades of anxiety and frustrations, brought about a climax in the war and execution of Serbs in the last decade of 20th century, as well as by the bombing campaign of NATO alliance in 1999. And the last but not least these relationships were highly affected by unilateral declaration of independence of so called state of Kosovo in 2008, all of which was transferred to the everyday lives of Serbs and Albanians in Jablanički and Pčinjski Counties. Tension among the population that has been residing on these territories was well known to global organizations (like UN) which had the mandate to support and realize projects aimed at pacification of these anxieties and at peace consolidation in the south of Serbia. This UN and PBILD project has such a purpose and its results we are going to present and analyze in this paper.

they significantly affected all the three phenomena placed in the foci of the researches. Key event was the erecting of the memorial to the former members of OVPBM (Liberation army of Preševo, Bujanovac and Medveđa, in Preševo (November 2012), and its removal afterwards on January 20th 2013, on the request of the political elite of Serbia. The memorial should have been removed before January, 17th, i.e. by the date when the fourth round of negotiations in between official authorities of Belgrade and Priština had been scheduled. Not only had it not been performed by that deadline but delegates of the Parliament of Municipality of Preševo have adopted the proposition on its erection after the assigned deadline and retroactively whatsoever. At that time this had become the breaking news in all national and local media and it had dominantly shaped public opinion, especially at the southern part of Serbia. Another important event was the negotiation process in between Belgrade and Priština, which was initiated immediately before the realization of this research. Since all the processes in Kosovo and Metohija have necessarily had an influence to the south of the Republic, in particularly to the places where ethnic Albanians constituted a majority, it was to be expected that Albanian officials there will request the same status like Serbs at the north of Kosovo and Metohija. This plea for the new status could have represented revival of hostility between these ethnic groups and additional jeopardizing of security of citizens in the southern part of Serbia. These conditions created strong incentives for the repetition of the research carried out in 2010. Finally, further economic deterioration of the overall country should also be taken into due consideration along the onset of world economic crisis in 2008⁵ the event which mostly affected the already impoverished population especially in southern parts of the state.

Our field research has however been carried out in two waves on representative samples – in 2010 there were 1548 respondents and in 2013 a total of 1678 respondents. Population from 5 municipalities from the two counties were selected – Preševo, Medveđa, Bujanovac, Leskovac

5 The onset of world economic crisis in 2008 has hampered living standard of Serbian citizens in many ways. Firstly, remittances which have flowed from our diaspora out of western developed countries have been drastically decreased, which had produced further effects onto volume of consumption of local population. Furthermore the investments of foreign companies have been reduced which had a strong impact on the business and consequently influenced payments of employees and in many cases their layoffs. And finally, foreign funds raised after 2000 for the purposes of assistance of revitalization and democratization of Serbian society have been withdrawn while latter have significantly supported so called third sector, i.e. civil society, which created posts for the vast majority of mostly educated population (Lazić, 2005).

and Vranje. Generalizations for the level of the counties are made possible because empirical research has not been planned and realized through case studies of these towns but instead selected samples represent citizens of both counties.

Theoretical foundation of our approach is laid down through micro-analytical models⁶ which accentuate a person, the one who makes decision on migration, i.e. he/she expresses plans to move. His/her intentions are indicated by the survey question tackling future plans. There are nevertheless numerous criticisms by researchers of migration potential. They are against posing questions on individual plans. In the first place they complain that this method cannot perceive whether and when these migration intentions are going to be pursued and how long the person is going to stay out of the place of residence or across border⁷. Secondly, an estimate of migration potential depends on the type of question and a way how the whole survey is designed. Furthermore it is unclear if migration intentions foresee legal barriers which can be later lifted (e.g. due to a membership in EU, etc). Then it is hard to assess whether the predictions have been realized also due to the difficulties in monitoring and registration of movements.

However despite these general critiques to this still commonly used methodological approach, including also those referring to the preciseness of data to be gained and process, we still deem that each study of migration potential which is founded on field research is useful in many ways. First, by analysis of gathered empirical evidence we can assess adopted theories on a profile of potential migrant and then we can discover most frequent reasons which push citizens to get to think about leaving a place of their living (so called *push* and *pull* factors). Statistical, official monitoring of movements of population is unreliable and incomplete whatsoever and it does not disclose any information on motives of the migrations. Such data could be gained only by carrying out field researches, and latter

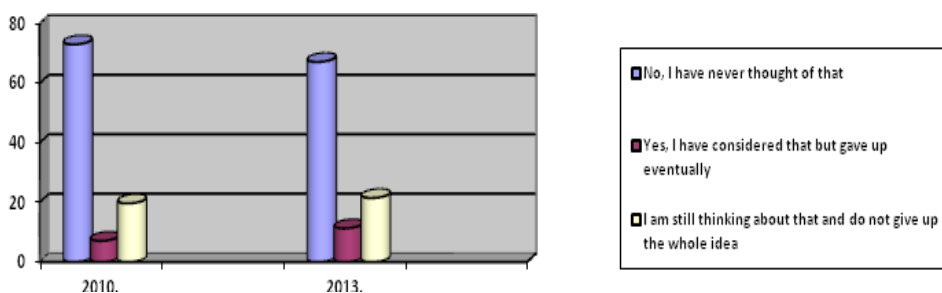
6 Besides this micro-analytical model, which will be applied in our analysis, there are also macro and mezzo models in the referent literature and in other researches of the phenomenon. Macro models imply political, cultural and economic structures at the level of state, place of origin and destination, as well as a world system. Mezzo models take into account structure, strength, volume and quality of social ties of migrants (Brettell & Hollifield, 2008).

7 In the questionnaire which was used as an instrument for collection of our field data which will be presented in our analysis, there was also one question referring to the planned duration of stay, which we shall be interpreted in the part on migration potential. However these answers are apparently tentative, since it is possible that a person gives up migration plan. This is also applicable when it comes to change in time spent in emigration if it had been realized.

are the only valuable from the viewpoint of stakeholders and state policy creators. Therefore the thorough analysis of problems of local communities with a high emigration rate lays down a solid base for creation of effective policies for mainstreaming of migration into both national and state policies. If we get to design a profile of potential migrant, we might get concrete directives for measures to try to retain population at greatest risk. Otherwise in the case of those who already left we can learn who they are and how they can be traced when it comes to utilizing their resources for a development of local communities where they come from.

MIGRATION POTENTIAL OF CITIZENS OF JABLANIČKI AND PČINJSKI COUNTIES

For the purpose of this analysis migration potential was operationalized through the following question: "Have you planned to move out of the place of residence due to work or some other reason?" Respondents could have selected following options: they have never considered leaving their place of residence, they have thought about it, but gave up eventually due to various reasons, and finally, they are still actively considering that. The results of both waves of research have been presented at Graph 1.



Graph 1. *Have you ever planned to move out of the place of residence due to work or some other reason – comparative analysis of data for 2010 and 2013 (in %)*

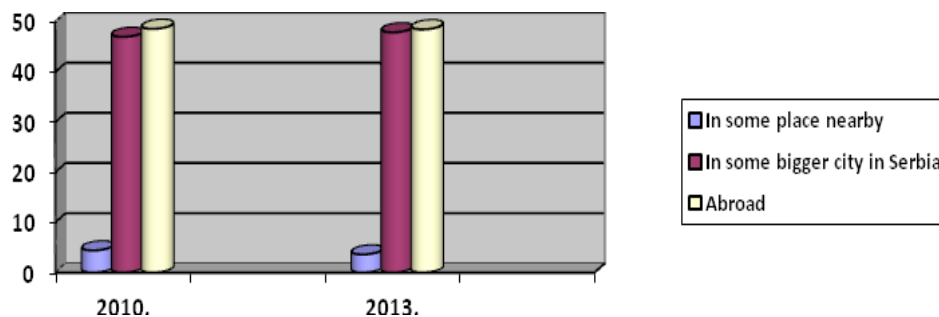
Source: Own calculations

Literature on migration recognizes several phases of process of spatial allocation. The first one is characterized by inertia toward migration, the second one to unfolding of inclinations to migration by way of overcoming "natural inertia" and integrating possibility of migration into potential alternative actions. Third phase denotes developing of concrete intentions toward migration through juxtaposition of multiple alternative choices (Krieger, 2004). Eventually there comes the third phase of furthering of

intentions through comparing various alternatives. A good example represents a model of rational choice where desired destination is attributed a higher degree of utility against a place of origin. Realization of migration plan is followed by final leaving a place of residence (Krieger, 2004). On the basis of previous graph 1 we can assume that the highest portion of respondents has been identified with the first phase of migration process. In 2010 as many as 73.1% interviewees declared that they never thought of moving out. In the next research wave this share slightly decreased to 67.2%. We believe the change was due to tumultuous socio-political events which took part in a meanwhile. However it is surprising that greater number of respondents who were previously considering emigration option eventually cancelled it despite the bleak happenings which preceded the research in 2013 – even 11.3% of them, while in the previous wave, in 2010, this portion was somewhat lower – 7.1%. The explanation might be looked for in further worsening of economic position, which had affected greater volumes of citizens and made them to give up their considerations and decisions despite previous willingness to leave their local community. Thus economic factor became even stronger against interethnic tensions and increased insecurity there. Migration potential indicated through a volume of people who had never gave up thinking of moving from their place of residence in Pčinjski and Jablanički counties in 2013 was registered as 21.5%, while three years before it was at a lesser extent – 19.7%.

Selectivity of migrants in terms of sociodemographic characteristics is well documented in literature (Morokvašić, 2011; Bobić & Babović, 2013; Bobić, 2013; Vesković, 2014). Primarily migrants ought to possess material resources in order to be able to move. This explains that results of migration potential in Pčinjski and Jablanički Counties as most impoverished parts of the country do not deviate much from the empirical findings for the country as a whole (Pavlov, 2009). On the level of global population of Serbia, vast majority of respondents reflected an inertion – as many as 68.2%. Among the rest of those who overtook 'natural inertion' and resorted to further considerations on migration – 12.2% eventually gave them up. Therefore the real migration potential might be estimated as 19.6% (Pavlov, 2009:13). Statistically speaking, this finding does not differ significantly from our data referring to the southern parts of the country. To put it more precisely it comes out that as many as one out of five citizens of Serbia are at risk of emigration.

When looking into enlisted destinations of potential migrants we can see that there is not a great differentiation among respondents who plan to move across the state border and ones who would like to move to some bigger town or city in Serbia Graph 2.



Graph 2. *Where have you planned to emigrate? – Comparative analysis of data for 2010 and 2013 (in %)*

Source: Own calculations

If we put aside material expenses related to migration, the finding that there is an equal number of potential external and internal migrants might have been interpreted by introducing 'emotional costs' into the discussion about these two types of movements. It is notorious that living conditions in the West are much better compared to any part of Serbia and that advanced economies offer better chances for employment, especially regarding posts which are less willingly accepted by domicile population, or those aimed at talented people. However separation from the family and friends and urge for adjustment to novel values and norms might aggravate decisions on emigration abroad. It therefore might be natural that many persons resort to internal movements, which implies their closer monitoring and registration which should have been given much more attention.

Reasons stated by respondents who cancelled their decisions to emigrate testify for the importance of emotional reasons – Table 1.

Table 1. *Reasons for giving up to emigration – comparative review for 2010 and 2013 (in %)*

Reasons	2010.	2013.
Family: Duties and connectedness to the family	32.7	48.9
Economic situation has been improved	4.1	17.7
Lack of material resources	14.3	17.0
Age	6.1	3.5
Fear of not being able to adjust to the new settings	2.0	1.4
Other	38.8	13.5

Source: Own calculations

Dependence to the local community reflected in the expressed anxiety as to adaptability to new settings as well as relatedness and feelings of responsibility towards family have all been denoted as leading reasons for

giving up ideas of migration. These are psychological factors affecting a process of realization of movements. According to our data, one can conclude that these have been also identified in 2013 and they were no less than three times stronger compared to economic obstacles i.e. shortage of money for traveling. Figures from the table 1 correspond to results of other domestic and foreign researches. Personal and family variables have been highly prominent when tested in the regression model of migration which had been applied onto data gathered in the field research of general population of Serbia, carried out by the Institute for sociological research, Faculty of Philosophy in Belgrade in 2012 (Poleti, 2013). The very same variables showed to be relevant in a regression model applied on the data collected for the population of Czech Republic (Fidrmuc & Huber, 2007).

Nonetheless there are researchers, Fassmann and Hintermann, who are considered as pioneers in dealing with phenomenon of migration potential in former socialistic states. They are renowned for investigating populations of states which have become full members of EU long time ago – Slovakia, Poland and Hungary. They consider real migration potential to be far below the level identified through rate of persons at risk of moving away (Fassmann & Hintermann, 1998). According to them, only the number of respondents who are persistently thinking about migration represents total migration potential. Furthermore they deem so called 'probable migration potential' as proxy of respondents who not only continually think of migrating but have also performed some preparatory actions therewith. Real migration potential, as they state, can be calculated on the basis of respondents who are showed to be insistent in their intentions when it comes to cross border migrations and who had submitted requests for working or residence permits whatsoever (Fassmann & Hintermann, 1998: 61). Having in mind that our investigation includes also internal migration, the group of potential migrants will be broadened by including those who searched for job or housing in the desired destination both abroad or in the country. In Table 2 we present migration potential of Jablanički and Pčinjski counties with regard to the difference posed by the above authors.

Table 2. *Migration potential of Jablanički and Pčinjski Counties – in %*

TYPES OF MIGRATION POTENTIAL	2010	2013
TOTAL MIGRATION POTENTIAL	19.7	21.5
PROBABLE MIGRATION POTENTIAL	9.3	11.1
REAL MIGRATION POTENTIAL	6.2	10.2

Source: Own calculations

While total migration potential of citizens of southern part of Serbia does not differ much compared to the one found in Serbia as a whole, the highest level of difference is registered when taking into consideration real migration potential. The latter is as low as 0.5% at the level of Serbia as a whole (Pavlov, 2009:16) while in Pčinjska and Jablanička Counties in 2010 it was 6.2% and three years later it even rose up to 10.2% (2013). This significant variation is related to the fact that our analysis encompassed respondents who are planning to move to some other town or region inside the country as well. Secondly, somewhat higher resolution to emigrate for population of Pčinjski and Jablanički Counties might be interpreted as a consequence of social conditions and the very fact that these territories, especially two municipalities in Pčinjska County, Bujanovac and Preševo are representatives of so called "second emigration zone" (Penev & Predojević-Despić, 2012: 52). Throughout 1990s and along the escalation of crisis following the disruption of SFRY there was a permanent increase of emigrants, particularly from Bujanovac and Preševo. In between censuses 1991 and 2002 the volume of emigrants increased more than four times (Penev & Predojević-Despić, 2012: 52). Their long term stay in destination countries (more than two decades up to now) facilitated movements of further potential migrants from Serbia. Both strong and weak ties to migrants (Predojević-Despić, 2009) of the same origin represent valid channels of information on employment and housing in countries of destination, as well as for receiving letters of guarantee which are needed when submitting a request for residence and work permits abroad.

Total migrants' potential, without specifically extracting real migration potential, represents serious threat for these counties, as well as for the country as a whole also because of their proximity to state borders. In between two censuses (2002–2011) the total number of population in Jablanički county has decreased by 24,619 (Census of population, households and dwellings 2011 in Republic of Serbia, 2014), while in the same period in Pčinjski County the decrease was even starker – 68,609 (ibid). The latter corresponds to the disappearance of one medium size town in Serbia. This means that in the county with an evident and permanent shrinking of population, no less than 10.2% citizens submitted visa requests or have already found housing or job in another town or country (real migration potential) as well as that even 21.5% has been seriously considering reallocation (total migration potential)⁸. Latter facts are high-

8 If transferred into numbers it would read as follows: in Jablanički County which according to the Census of population 2011 had total of 216,304 persons, as many as 22,063 have already performed concrete steps for allocation while in Pčinjska County,

ly concerning for actors at both local and national level. Depopulation at the very borders of the state always induces a threat to national integrity, thus fact and figures stated above should initiate creation of effective and efficient state policies. Therefore it seems important to get a closer insight into the problems and needs of local population (“push” and “pull” factors) as well as to learn about the characteristics of population at greatest risk of moving away (sociodemographic characteristics).

DEMOGRAPHIC CHARACTERISTICS OF POTENTIAL MIGRANTS OF JABLANIČKI AND PČINJSKI COUNTIES

Selectivity of migrants and potential migrants in terms of their particular socio-demographic features has been outlined as very important in the referent literature (Bobić, 2007; Werheimer-Baletić, 1982, 1999). Given a freedom of movement of population in between places of origin and destination there is so called autoselection of migrants in a population as a whole. The inclination toward emigration is linked to the following specific characteristics: sex, age, marital status, education, economic activity, etc (Werheimer-Baletić, 1999). According to previous researches the strongest statistical bond has been documented in between age and emigration (Bobić, 2007: 108). In the ages 20–40 most persons make decisions to move because of a highest probability for smooth adjustment to new life and work conditions as well as due to gaining greatest possible effects from favorable settings in places of destination. Concerning the influence of sex in previous economic migrations, men were predominant, while in contemporary postindustrial societies there are more young and educated women who participate in movements, thus researchers coined the term ‘feminisation of labor force’ (Pešić, 2013). One of the repercussions of a process of feminization of migration (Bobić, 2007: 111) stemmed from the shifts in education of persons on the move. In previous decades, in 1960s persons with lower education and less qualified were predominant in economic migrations (workers’ occupations), while mobility nowadays is much more related to young, highly educated experts. The fact is however that there is one feature which stayed unchanged – most of migrants belong to middle

enumerating 159,081 people (the total that should be doubtful about due to the boycott of Census by ethnic Albanians) emigration plans were pursued by 16,226. If we have in mind that total migration potential can be transformed into real one at any time, the volume of those who leave place of residence might become even greater – in Jablanički County as many as 46.505 persons think about movement and in Pčinjski – 34,202, making altogether a very high score of 80,707.

strata. This is also one of its main characteristics – on one hand mobility is still out of reach for most impoverished population because it incurs financial costs and is mostly attractive for persons from middle social positions who possess resources to undertake it and on another hand they feel they cannot fulfill personal needs in their country of origin.

By applying data collected in this empirical research, we resorted to creation of a model of binary logistic regression aimed at measuring the impact of independent variables, chosen because of their presupposed influence onto the decision of emigrating. Other than upper stated demographic characteristics as independent variables which are deemed relevant for respondents – potential migrants, our model also included three additional variables. One stems from ethnic composition of the population of the investigated counties, which we treated as significant. As we have already outlined when describing the context of our research, happenings at Kosovo and Metohija have produced an evident effect onto the relationships of citizens of the southern part of Serbia. Wherever there is a major Albanian population there occurs stronger interethnic tension and this produces the sentiments of endangered civil security. The latter is however often cited as an important reason for decision on movement. Since the spatial concentration of ethnic Albanians is greater in Pčinjska than in Jablanička County, we assumed that place of residence might have had an effect onto the migration potential. Secondly, previous migration experience is often interpreted as a very important factor for future migration decisions (Predojević-Despić, 2009; Meyer, 2001; Massey, 1988). These experiences enable smoother running through the bureaucratic procedures and overtaking various phases of change of place of living and they present sources of valuable social capital. That is why we integrated the factor of possession of migratory experience as an independent variable into the model. Finally we accepted the statement that general satisfaction with life in both economic and social terms should have been adopted as an independent variable when analyzing migration potential (Mojčić & Petrović, 2013).

Having in mind quoted independent variables, our model is as follows:

$$\log P_i / P_j = Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9$$

In which:

Dependant variable: Y is a dichotomous categorial variable where the category for testing (i) consists of respondents who think about leaving their place of residence (thus total migration potential), while the referent category (j) is represented by respondents who do not consider moving out from their place of living or who gave it up eventually for various reasons.

- β_0 – constant;
- X1 – the County where respondents belong, whereas citizens of Pčinjski County are observed in relation to those from Jablanički County as the referent category;
- X2 – sex, where men are observed in relation to women as referent category;
- X3 – marital status, where those who are not married have been observed in relation to married ones as referent category;
- X4 – age, where respondents aged 15-29 and those 30-49 are treated relative to those over 50 as referent category;
- X5 – education, where respondents with tertiary and ones with secondary education are observed relative to respondents with primary education as referent category;
- X6 – labor market position, where employed and unemployed respondents are observed in relation to inactive population (retired and persons with disabilities) as referent category;
- X7 – ethnic background, where Serbs and Albanians are observed in relation to other national groups (Bulgarians, Montenegrins, Roma) as referent category;
- X8 – previous migratory experience, where respondents who possess them are observed in relation to those without this experience as referent category;
- X9 – general life satisfaction, where respondents who assessed their individual and family life as good quality are observed in relation to those who had said that their lives are hardly bearable, as a referent category;
- β_1 – parameter of the impact of the County where interviewee lives;
- β_2 – parameter of the impact of the sex of the respondent;
- β_3 – parameter of the impact of the marital status factor;
- β_4 – parameter of the impact of the age factor;
- β_5 – parameter of the impact of the degree of education factor;
- β_6 – parameter of the impact of the labour force status factor;
- β_7 – parameter of the impact of the ethnicity factor;
- β_8 – parameter of the impact of previous migration experience factor;
- β_9 – parameter of the impact of general life satisfaction factor;

Table 3. Main statistical indicators in the model of binary logistic regression

Parameters	B	Sig.	EXP(B)	95% C.I. for EXP (B)	
				Lower	Upper
County (Pčinjski)	.942	.000	2.565	1.910	3.443
Sex	.371	.013	1.449	1.081	1.941
Marital status	-.154	.363	.857	.615	1.195
Age		.000			
15-29	1.068	.000	2.911	1.835	4.616
30-49	.635	.000	1.887	1.345	2.649
Education		.644			
Secondary	-.154	.431	.858	.585	1.257
Tertiary	-.035	.884	.966	.605	1.541
Working status		.000			
Employed	.439	.117	1.551	.896	2.687
Unemployed	1.254	.000	3.504	2.141	5.734
Ethnicity		.009			
Serbs	.264	.292	1.302	.797	2.126
Albanians	.828	.005	2.289	1.276	4.107
Experience with migration	.266	.092	1.305	.957	1.779
Life satisfaction	1.043	.001	2.839	1.523	5.290
Constant	-4.530	.000	.011		

Source: Own calculations

Cox and Snell R² and Nagelkerke R² indicate the amount of variation in the dependent variable explained by the model. In this model, the Cox and Snell R² and Nagelkerke R² are .127 and .197, suggesting that between 12.7% and 19.7% of the variability is explained by the independent variables used in this model.

Based on the table 3 we might conclude that not all predictors have showed significant in the model such as – marital status, education, employed versus referent category of inactive, belonging to Serbian nationality and earlier migratory experience.

To the contrary the strongest predictor of migration considerations is unemployment, thus we can assume that respondents who are jobless and actively searching for it are much more prone to leaving their place of residence compared to inactive ones. Since the odds ratio is calculated as 3,504 we can conclude that they are more than three and a half times

more at risk of emigrating compared to those out of work force. Based on the data from the model we can also point out that age has an important impact – respondents up to 29 are at almost three times greater risks of migrating compared to those over 50. Similar findings refer to life satisfaction, where respondents who assessed their individual and family lives as more or less miserable are as nearly three times closer to emigration decisions (odds ratio 2,839) compared to those who cite that their household is well off. Following predictors showed to be somewhat less significant but still important: County, sex, Albanian ethnicity.

To summarize, potential migrant from the two investigated Counties seems to be: young, unemployed Albanian, male, from Pčinjska County, who is dissatisfied with his individual and family quality of life. What surprises us mostly is that his education and earlier migratory experience do not play some greater part.

The finding which is mostly worrisome is that young people, less than 30 of age, those in their most productive life course and ready for entering into unions, bearing and rearing children, are simultaneously at greatest risk to emigrate. Their potential leave would produce farreaching consequences for the preservation of the number of citizens in these counties. However outflow of this population is neither unique for these territories nor for Serbia, but is ubiquitous. Namely in various researches which we referred to a strongest statistical bond is showed to be in between age and migration, implying that young people less than 40 years of age are most dominant among those on move (Bobić, 2007: 108). This finding could be interpreted by: firstly, abilities related to this life period (better fisical condition and general health, proness to entrepreneurship, imitativeness, creativity, greater adjustment skills, etc) and secondly, by labour market demands (for: younger persons, with better fisical and health status, etc.) (Mojčić & Petrović, 2013: 232). Therefore these facts reflected also in our research could be interpreted as an outcome of economic rationality of migrants as well as structural, work force demands (Werheimer-Baletić, 1999: 307).

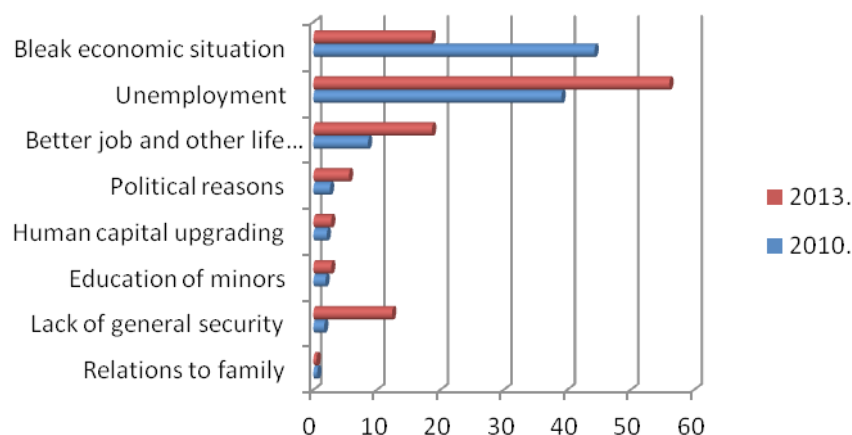
The model further demonstrates that males are readier to move than females. However contrary to the researches conducted by the mid of previous century our model discloses that influence of sex is not that important. This is in concordance to the statements of contemporary authors on feminization of migrations due to the shifts in gender roles in division of work predominantly in a public sphere though (Pešić, 2013). Still there are two features or predictors that do not fit into the 'rule' and our expectations and these are marital status and education. Research results

showed that it is usual that migration decisions are made by single persons or those unmarried (Mojčić & Petrović, 2013; Poleti, 2013; Vesković, 2014), due to rarer feelings of connectedness to the family and responsibility to it. The same was true in our research where family issues have been most frequent reason for delaying or canceling of plans on migrations whatsoever. When it comes to education there is a tendency of persons with higher education to be more frequently on the move compared to the less educated, which has however not proved valid for our respondents.

MOTIVATION BASIS FOR POTENTIAL MIGRATIONS OF JABLANIČKI AND PČINJSKI COUNTIES

In previous chapter we have dealt with demographic profile of citizens of investigated counties with migration intentions. This chapter will be devoted to presenting explicit motives for emigration from the current place of residence. According to “push-pull” theory (Zimmermann, 1996) there are push factors in the place of destination which instigate people to leave it as well as factors attracting people to settle down in places of destination. International organization for migration (IOM, 1999), differentiates five *pull* factors: better conditions for living and earning, other people’s migration experience, solid employment perspective and personal freedoms; and two *push* factors: ethical and economic problems in a country of origin.

These two types of factors might be recognized in our research through the question: “Which is the main reason you want to move out of your place of residence?” Responses are summarized in the Graph 3.



Source: Own calculations

◀ Graph 3. “Which is the main reason you want to move out of your place of residence?” – Comparative analysis of data for 2010 and 2013 (in %)

On the basis of results presented in the Graph 3 we can assume that firstly, larger share of respondents cite *push* factors from the place where they live compared to *pull* factors of their desirable destination and then in both cases economic reasons are vastly predominant. As to *push* factors in 2010 respondents were more keen to point out bleak economic situation which affected living standard of all citizens while in 2013 they prioritized poor economic situation due to inactivity at the labour market. Nonetheless both *push* factors – poor individual and social economic situation is mostly cited in responses in both waves of research. This *push* factor has been indicated in other researches (Grečić, 1996. & 1998; Fassmann & Hintermann, 1998; IOM, 1995, 1997, 1999; Božić & Burić, 2005; Hooghe, Trappers, Meuleman, & Reeskens, 2008). It was surprising that the feeling of insecurity was rarely outlined as a *push* factor (in 2010 there were only 0,6% of responses while in 2013 it fell to as few as 0,2%) which was a bit unexpected, having in mind previously many times mentioned interethnic tensions in these counties.

Respondents outlined larger job opportunities and better life perspective as main *pull* factors which can be treated as logical reaction to unemployment and poor economic situation, being simultaneously mean *push* factors in respondents' current place of residence. Regarding the fact that there is no university center in any of counties it looks oddly that human capital improvement as well as schooling of offspring were not that frequently cited motives for mobility. Furthermore since many citizens from these counties work at some place other than their place of permanent residence we have also hoped for family reunification to be more present since this is one of the often mentioned features/motives of contemporary migrations (Levitt, 2001).

CONCLUSION

Total migration potential in Jablanički and Pčinjski Counties in 2010 was 19,7% and in 2013 it rose slightly to 21,5%. When compared to the estimates for the country as a whole posed by NGO Group '484' as 19,2% in 2009, it comes out that they do not differ significantly despite much poorer economic, social and political circumstances of these territories than of the rest of the state. However our findings indicated that in 2010 – 6,2% and in 2013 even more – 10,2% respondents of these counties already undertook concrete steps to change their places of living and therefore citizens from the south of the state showed stronger resolution to mobility. The difference is obvious since at the level of general population of Serbia this level is as low as 0,5%. This result is in line with pessimistic forecasts

according to which depopulation will continually take place in Serbia, especially in its southern and eastern parts. The only one encouraging finding is that desired places of destinations are almost equally some other town or city in Serbia as well as abroad.

Analysis of mutual relations of sociodemographic characteristics of potential migrants through the model of binary logistic regression has demonstrated that there is no significant discrepancy to the already adopted generalizations of contemporary migrations. Thus the highest risk of migration has been demonstrated among young population up to 30 years of age, unemployed and therefore dissatisfied with their quality of life. Bearing in mind that their potential emigration represents a major loss for the local community and a whole state, these findings convey clear message to actors responsible for creating conditions for improvement of their position so that their exodus might have become stalled or at least minimized.

Dissatisfaction with economic conditions and unfavorable position at the labor market has been reflected onto leading *push* factors cited by respondents. Basically bad living conditions and unemployment are forerunners but these do not differentiate citizens from southern parts of Serbia to other potential migrants from other traditionally emigration regions, both inside the country and across it. The only variation which we have been expected to discover was a feeling of insecurity due to the events in southern Serbian province of Kosovo and Metohija and concomitant long term tensions in between Serbs and ethnic Albanians. Nonetheless the latter was quoted by very few respondents.

The same holds for *pull* factors where citizens from Jablanički and Pčinjski Counties do not differ crucially compared to potential migrants from other field researches. Bad living standard summons to emigration and raises hopes that at some other place/country there will be better paid jobs offered as well as greater chances for career promotion and overall advancement. Yet as it often happens that original hopes might have been thwarted (particularly after imposition of many cuts in the developed world since 2008, reflected also on our emigrants) it can be expected that vast majority of those who succeeded in realization of their migration intentions finally decide to return to their places of origin where prevailing values and customs they are very well familiar with.

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MIGRATION TO VOJVODINA IN RESEARCH OF JOVAN CVIJIĆ AND DURING 20TH CENTURY

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ABSTRACT: Researching the migrations on the territory of the Balkan Peninsula Jovan Cvijić identified several migration streams. Two streams were extremely strong, from the Kosovo and Vardar regions: the migrants crossed the Sava River and the Danube River and populated the southern parts of the former Austro-Hungarian Empire. The most massive displacement and crossing of the rivers mentioned above happened in the late seventeenth century, when immigrants came up to Budapest and Szentendre. According to the researches of Jovan Cvijić, in addition to the two streams in the migrations across the Sava and the Danube rivers, migrants also came from other areas of the Balkan Peninsula. The migrations researched by Jovan Cvijić affected to some extent the rearrangement of migrants in the territory of Vojvodina after the First, then after the Second World War, and then these migrations affected the rearrangement of migrants in the 90s of the 20th century. There are various causes of migration, those before the 20th century, and those in the 20th century. Economic and safety reasons predominate. The speed of migration depends on the cause of migration. According to Jovan Cvijić, the gradual resettlements were metanastasic movements. During the 20th century there were also similar migrations caused by economic, but also by security and safety reasons. In addition to the similarities between the causes of these migrations during the centuries there are also similarities in terms of the origin of migrants.

Key words: Jovan Cvijić, migrations, Vojvodina, Sava, Danube

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INTRODUCTION

The geographical position of Vojvodina, as well as fertile land were the main factors that attracted many migrants on its territory. Historically many nations passed through this area. Some of them left a material trace, and some are only mentioned in historical records. A more detailed movement of population on the territory of Vojvodina can be traced back only from the 17th and 18th centuries. Since then it is an area in Europe, which had a great dynamic of movement and changes in the ethnic and religious composition of the population.

Until the late 17th century the area of today's Vojvodina was a desolate and largely unknown territory. Large territories, especially in the area of Banat were swamped and because of that they were quite difficult to live in. Settlers, colonists in the 18th century, especially the German population, would also prove this statement as they declared the area of Banat a "tomb" (Jankulov, 1961). At the end of the 15th century, according to Hungarian researcher Karoly Kocsis, there were about 194,000 inhabitants on the territory of Vojvodina (Internet 1), which indicates that there were approximately 9 inhabitants/km². This number of population was calculated on the basis of the data processed on the tax census carried out in 1495 by Sigismund Ernust, who was a chancellor of the Royal Treasury. Of course, there is a lack of relevant census data that would give us the exact number of residents in that area. The first census, which gives accurate data on the number of inhabitants in the territory of Vojvodina was performed in 1828 in Buda on request of the Hungarian regency council. The data was collected by Ludovic Nagy, a member of the Hungarian regency council, based on the records of church schematism. According to the census, 1,090,886 inhabitants lived on the territory of Vojvodina. Two thirds of the population were Catholics, one-quarter were Orthodox and one-tenth were Protestants (Kršev, 2013).

The exact changes in population of Vojvodina during the 17th and 18th centuries unfortunately, according to current sources are not known. During this period there were significant changes in ethnicity and there was an increase of population, i.e., the almost deserted area was converted into a populated territory which can be inferred on the basis of the known migration of population. According to Dušan Popović (1990) about 210,000 Serbs lived in Vojvodina in 1690. They constituted the dominant ethnic group in the area after the penetration of the Turks into Balkans. Besides Serbs, Dušan Popović (1990) mentions the presence of Šokci. In addition to the immigration of Serbs, the 18th century was marked with

the colonization of population, mostly Catholics and Protestants (Germans, Hungarians, Czechs, Slovaks, French, Italian). This organized immigration transformed Vojvodina from deserted areas into a territory of great ethnic diversity.

According to official data of the Austro-Hungarian Empire, and the Kingdom of Serbs, Croats and Slovenes, the Kingdom of Yugoslavia, as well as the states that emerged after the Second World War, which Vojvodina was part of, the population of the area was constantly increasing until 1981. In the inter-census period from 1981–1991 there was a population decline, which was recorded for the first time since the beginning of continuous population census of Vojvodina. In the following period there was an increase, due to forced migration, and in the course of the last two censuses (2002–2011) there was a population decline (Table 1). The growth of population in Vojvodina in the periods between the censuses was significantly affected by migration and population growth.

Table 1. *The changes in the number of population between 1869 and 2011*

Year of Census	Number of population	Year of Census	Number of population
1869	1,152,468	1953	1,698,640
1880	1,179,230	1961	1,854,971
1890	1,332,635	1971	1,952,560
1900	1,429,271	1981	2,034,782
1910	1,505,755	1991	2,013,889
1921	1,535,794	2002	2,031,992
1931	1,624,158	2011	1,931,809
1948	1,640,599		

Source: Ćurčić, 1996; SORS, 2011.

Changes in the number of population of Vojvodina significantly depended on migrations. This work does not analyze the migrations planned by the court in Vienna, but the ones that were planned, forced, massive and uncontrolled and that brought settlers to Vojvodina from the southern regions, respectively south of the Sava and the Danube rivers. Jovan Cvijić devoted an important part of his anthropogenic researches of the Balkan Peninsula to the study of migrations, among which he paid some attention to the ones that led the population across the Sava and the Danube rivers. Cvijić paid even more attention to the changes and the consequences that occurred due to migrations as well as to pointing out the consequences of migrations (Vasović, 1994).

MIGRATIONS OVER THE SAVA AND THE DANUBE RIVERS FROM CVIJIĆ'S RESEARCHES UNTIL THE 21ST CENTURY

In his study *Anthropo-geographical Problems of the Balkan Peninsula*, Jovan Cvijić gave a very good methodological basis for the study of migrations, the origin of population and consequences of migrations. With his research Cvijić established that the population of the Balkan Peninsula was in constant motion since ancient times. On the one hand, population from other areas settled, on the other hand, there was relocation within the Balkans. Due to the constant relocation the density of the population changed. In some areas it increased, while in other parts the population receded. Cvijić gave a statement about the Balkan peninsula which almost nowhere can be read (Vasović, 1994): "When we exclude migrants from those European countries from which the population in very large masses emigrates in the colonies or to America, in Europe there are no areas ethnographically so restless, and with such frequent new movements of population and with such significant ethnographic processes of merging and disorders, as the Balkan Peninsula" (Cvijić, 1987, 101).

With the study of migrations Cvijić established a very important fact – the largest migrations of the Balkan peoples, and particularly Serbian people, originated from the time of the invasion of the Turks in this region, and in the period from the late 14th century until the late 18th century, there were eight major migrations. By the time of the arrival of the Turks, migrations were directed to the south of the Balkans, and from the time of the arrival of the Turks, the migrations changed direction of movement and were oriented to the north. The Hungarians, Šokci and Croats retreated to the north and west, and in their places Serbs settled from Raška, Bosnia, Montenegro and Herzegovina. The migration of the Serbs to the north, from the area of Raska occurred also before the arrival of the Turks, at the time of King Dragutin. There were Serbs and before his reign in Srem and Banat, but during his reign the number has increased. The increasing number of Serbs from the area of Raska in Banat, was particularly characteristic for the 15th century. Two zones were formed - on the Danube and the Maros. When Despot Stefan Lazarević became the owner of Becse and Vilagos seigniory, the number of Serbs who emigrated from the southern area particularly increased. In the second half of the 15th century, Serbs from Bosnia immigrated (Popović, 1990). Large displacement of the Serbian people occurred during major campaigns in 1450, 1465, 1481–1483, and particularly in the period from 1526 to 1560. This is the time of the greatest migrations since the settlements in the Balkans

by that time. The Serb population inhabited the areas abandoned by the Hungarian population. The Hungarians left this area in great number after the battle of Mohács (in 1526). Serbs settled in the peaceful times and in wartime. It is difficult to determine when there were more. In the mid 16th century Banat and Bačka were inhabited, in large number, by the Serbs.

The Serbs in Banat in the 16th century who immigrated from the Balkans were from Sumadija and southern regions. Their last names indicated this fact, if we can speak about last names in that time. However, it is difficult to determine the past on the basis of names, because even in the 17th century surnames were not permanent but were formed on the basis of the father's name, according to certain characteristics, professions or position in society (Popović, 1990).

Cvijić stated that in the Balkans there were continuous "wanderings" of the population. From the mountains to the lower parts. Some population also emigrated from the mountainous areas, because of overpopulation of certain areas, as well as to search for better economic conditions. Jovan Cvijić singled out four large streams of migrations in the Balkan Peninsula. The most massive was the stream from the Dinara mountains, the Kosovo-Metohija stream was one of the oldest, then the Vardar-Morava stream within which the population crossed the Sava and the Danube (Pavlović, 1998).

At the time of the invasion of the Turks, in addition to the streams that took place across Serbia, there was also a clear Dinara stream that did not go through Serbia. These immigrants settled in parts of Croatia (Slavonia, Baranja), in parts of Slovenia (Styrian, Kranjska), but also on the territory of Vojvodina (Bačka). The majority of these migrants were residents of low and central Bosnia, then Herzegovina, Raska and Montenegro. Most of them were Orthodox, but there were also Catholics. Most Catholics who immigrated were Šokci who mostly settled in Baranja and Bačka (by the Danube) and Bunjevci (Cvijić, 2011). According to Popović (1990), Bunjevci were settled down in the late 17th century, around 5000 of them. They immigrated from Herzegovina, western Bosnia and Dalmatia, and it seems mostly from Mostar, from the area around the river Buna (Cvijić, 2011). They settled in Subotica, Sombor, Senta, Baja and the surrounding areas.

The streams that crossed the Sava and the Danube rivers were formed from the Kosovo and Vardar streams together with the population of Morava's Serbia ("especially with the population of the Ibar and the Western Morava rivers, with the population of Smederevo, Požarevac, Homolja and the old population of the Timok region" (Cvijić, 2011, 137).

These very strong streams split north of the Sava and the Danube, "all over the Pannonia Basin and Transylvania among the old Slovenian population, who settled here during the great migrations, and which was amplified in the Middle Ages by a number of Serbian migrations" (Cvijić, 2011, 137). Among the migratory streams the population got mixed and crossed. Thus, there are immigrants from Serbia in Western Slavonia, and the Dinar population from Bosnia, Herzegovina, Dalmatia and Lika immigrated to Srem, Banat and Bačka (Cvijić, 2011).

The most significant migrations mentioned by historical sources, which Cvijić also studied, occurred in 1690 after the withdrawal of the imperial Austrian army from the territory of today's Kosovo during the Great Viennese War (1683–1699). During the Great Migration, people were led by Patriarch Arsenije III Čarnojević. The former residents, because they helped out the imperial army, were forced to go to the north out of fear of Turkish revenge. This stream, which was formed in Metohija and in Kosovo, crossed the Ibar valley and Moravian Serbia. It withdrew migrants originating from the Dinar stream (Cvijic, 2011). In late September 1690 around 40 000 Serb refugees were recorded in Belgrade. These refugees were transferred across the Sava and the Danube rivers, the largest number of them continued their journey to Buda and Szentendre. The refugees encountered problems in the Austro-Hungarian Empire too. The Austrian authorities did not allow the settlement of refugees in towns. They could settle down in the suburbs and separately. Serb refugees usually dug pits by themselves and this way formed shelters. The court's war council determined in which settlements the refugees could settle down. Komoran had a large number of refugees, but Szentendre is considered to have had the largest number. The exact number of Serb refugees in Szentendre is difficult to determine. According to a report there were about 12 000 in Szentendre, and in Buda about 6 000, and according to another report in Szentendre and its surroundings there were about 14 000. With this migration the northern parts of Bačka (Subotica) as well as Szeged and Baja were also populated (Popović, 1990).

There are several sources on the number of Serbs who emigrated together with Patriarch Arsenije Čarnojević. When you take a look at multiple sources, it can be concluded that the number is between 60 000 and 70 000 persons. What this number of population is, can be best seen if you point out how many residents were in the territory of Serbia of the time, which during the Austrian rule extended approximately as the territory of Milos's Serbia and had estimatedly about 70 000 inhabitants. Thus it is clear how many residents of Old Serbia, Kosovo, Metohija and Šumadija

emigrated with this migration. Most people, during this migration, were displaced from Old Serbia and Kosovo and Metohija. These two areas remained almost deserted. Most people were displaced from Priština, Trepča and Vučitrn, then from Stari Vlah, Podrinje and Mačva (Popović, 1990). However, according to Jovan Cvijić, this migration included approximately 37,000 families, or about 180,000 souls. This population inhabited Banat, Bačka and Srem. In the eastern part of the Pannonia Basin, these immigrants inhabited the surroundings of Arad, Vilagos, Batanja, Pec, then Lagos, Karanszebes, and the above mentioned Szentendre (Cvijić, 2011).

A mass migration of Serbs occurred also under the patriarch Arsenije IV Jovanović Šakabenta in 1739 after the Russian-Austrian-Turkish war. This migration involved a large number of Serbian populations who emigrated to escape the vengeance of the Turks. The Serbian population reached, with this migration, the Imperial Russia too. At the end of the 18th century, after Koča's Krajina (1788–1791), which covered the area between the Danube and the West Morava, The Great Morava area and the eastern part of Šumadija, there was also some emigration.

The migration at the end of the 17th century, as well as the Second great migration of Serbs (1739) led to major changes in Kosovo and Metohija and Old Serbia, but also in Vojvodina. The cradle of the Serbian state, culture and nation lost a great number of people, and Albanians took their place. While in Vojvodina the number of Serbs increased, especially in Bačka and Western Srem.

In Vojvodina, in the 18th century, Serbs were the majority population, and it is clear why the Hungarians called that area and marked it on the maps as "Serbia", "Racorszag" or "Racvilag". Serbs represented a compact mass in the area of lowlands of Banat and Bačka, and in the area between the Transylvanian mountains, Maros and a straight line drawn between Szeged and Baja. On the east Serbs were a majority to the line Timisoara - Bela Crkva. In the west between the Danube and the Drava they never constituted a majority and were not compact, there were more of them only in the Baranja County (Figure 1). Outside these borders there were quite a few Serbs in the area of Buda and Szentendre (Popović, 1990a).

This compact mass of Serbs was broken up later by planned migrations of the Imperial Palace. The migrations directed by the imperial power had the character of colonization, because they led to the break-up of the ethnic majority of Vojvodina of that time. A colonization of Vojvodina was executed because of the struggle for national prestige by artificial changing of the national structure. The biggest concentration of Serbian population in the Austro-Hungarian Empire was on the territory of the

Military Border (Figure 2). Their inhabitants served in the Imperial Army during the war and in peacetime worked on the land (Spasović, 2004).



Fig. 1. Ethnic majorities on the territories of Vojvodina of today in the 17th and 18th century (according to Jovan Cvijić and Dušan J. Popović) Source: Map basis overtaken – Internet 2

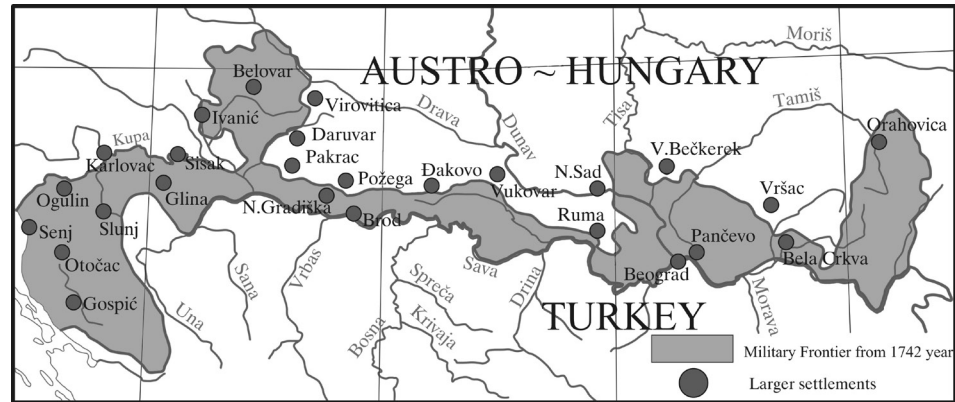


Fig. 2. The spreading of Military Border on the territory of the Austro-Hungarian Empire

A significant period of displacement of the population occurred during the First and Second Serbian Uprising. During the First Serbian Uprising

population from the southern parts that rebels didn't liberate emigrated. After suppressing the uprising, these immigrants fled to Srem and Banat, while at the time of the Second Serbian Uprising some of them returned (Popović, 1990a).

After the withdrawal of the Turks from the territory of Vojvodina, and then south of the Sava and the Danube, the volume of migrations across the Sava and the Danube was getting smaller. Migrations were individual and not on a large scale during the 17th and 18th centuries.

After these mass migrations across the Sava and the Danube, the next settlement on a large scale in the area of today's Vojvodina took place during the 20th century on several occasions. The twentieth century was marked with migrations which had great scope and frequency. In addition to mass migration, light, constant migrations also occurred to the territory of Vojvodina.

Mass immigration to Vojvodina in the 20th century occurred after the First, then after the Second World War and during the nineties. Migrations after the First and Second World Wars in the literature are known as the "colonization" of Vojvodina. However, these migrations are different from the older ones in number and quality and, essentially, do not have the character of colonization. These migrations took place under specific historical, socio - political and material conditions (Djurić, 1960).

In the first two decades of the 20th century, the migrations didn't have big importance in the development of the provincial population. In the late 19th and early 20th century, the province's population massively immigrated to overseas countries. Only after the First World War migrations had greater participation in the development of the population in Vojvodina. The altered state border was moved north and it stopped the several years' long immigration of non-Slavic population. In the south, Vojvodina was open to the central parts of Serbia which enabled the massive immigration from the Balkans. After the First World War the first organized migration of volunteers from the war occurred. The origin of these migrants could be found only after the Census 1961. According to this data around 9 % of the population immigrated before World War II. But due to mortality and migration of the previous twenty years, we cannot say the exact number of immigrants. In this migration, most people migrated within Vojvodina. A certain number of immigrants came from Šumadija. Among immigrants from more distant regions of the former Yugoslavia, a higher number of immigrants came only from Lika and the northern coast (about 6,500 persons). They were volunteers from the First World War (Ćurčić, 2006).

After the Second World War, a new large-scale, organized influx of migrants to the area of Vojvodina happened. Perhaps the largest group of migrants who in a short period of time immigrated to the area of Vojvodina occurred just after the Second World War (1945–1946). The highest number immigrated to the settlements where about 250,000 Germans emigrated from. The number of victims killed during the Second World War from the territory of Vojvodina is estimated at about 55,300 people. Thus, the population of Vojvodina with emigration and killings during and after World War II was reduced by more than 300,000 inhabitants. However, the Census of 1948 does not indicate a population decline, but growth (Table 1) which is a result of immigration and population growth. The best evidence of migrants is after World War II. 216,306 immigrants came after the war (1945 and 1946) (Đurđev, 1995). The most immigrants came from Bosnia and Herzegovina (83,091 or 38.4 % of the total number in Vojvodina). Most of them came from Bosanska Krajina. 52,929 immigrants settled down from Croatia (24.5 %), mostly from Dalmatia and Lika with the northern coast. 35,416 people immigrated (16.4 %) from Serbia, mostly from South Morava. From Montenegro 31,011 persons immigrated (14.3 %). 9,975 persons immigrated from Macedonia. From Slovenia only 1,592 persons immigrated, and from Kosovo and Macedonia 1,519.

The origin of these immigrants only partially has to do with the origin of migrants in the population movements studied by Cvijić. After the Second World War, most people moved from Bosnia and Herzegovina and Croatia to Vojvodina. Individuals from these regions during the existence of the Austro-Hungarian and the Ottoman Empire were present in the migrations to today's Vojvodina, but in much smaller numbers than the population from Kosovo and Metohija, the southern parts of Serbia and western Macedonia.

During the fifties, sixties and seventies immigrations to Vojvodina continued, but peacefully and with no government organization. According to some estimates, almost in equal number to the immigrants during the mass migration after World War II. During these migrations most people came from Bosnia and Herzegovina, central Serbia and Croatian. The eighties was a period of peace before the "Storm". In the nineties of the 20th century, especially in the 1991–1995 period a large-scale immigration of Serbian population occurred from Croatia and Bosnia and Herzegovina. These migrations almost completed the process of emigration from Serbian territories in the Republic of Croatia and the Federation of Bosnia and Herzegovina. According to the census of refugees in 1996, 257,739 refugees immigrated in Vojvodina, that makes almost 40 % of the total

number of refugees (646 066 persons). Most refugees immigrated in Srem (50.0 % of the total number in Vojvodina), then in Bačka (32.3 %) and in Banat (17.7 %) (Plavša & Bubalo-Živković, 2002, Bubalo-Živković, Ivkov & Kovačević, 2007). Refugees from Croatia dominated mostly from Dalmatia, Lika, Banija, Kordun, Eastern Slavonia.

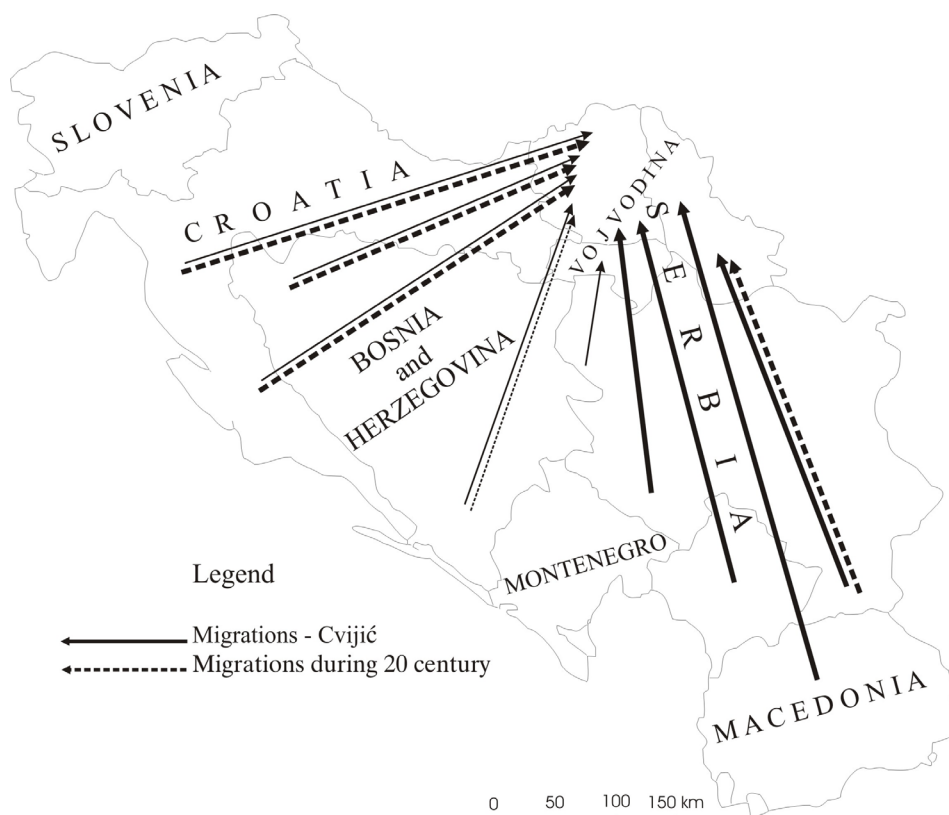


Figure 3. *Intensity of migrations studied by Cvijić and in the 20th century*¹

The area of Kosovo, Metohija, Stari Vlah, Raška, Šumadija, and western Macedonia were the regions where most people emigrated from across the Sava and the Danube in Cvijić's researches. During the 20th century migrations were diverted to the west and more immigrants were from Croatia and Bosnia and Herzegovina. Kosovo and Metohija, western Macedonia, in previous migrations lost a large number of Serbian populations, and they could not give a greater number of migrants during the 20th century.

1 Note: The thickness of the arrows indicates the intensity of migration.

THE CAUSES OF MIGRATION IN CVIJIĆ'S RESEARCHES AND IN THE 20TH CENTURY

What are the factors that had the most influence on the displacement of the population, and its immigration to the area of Vojvodina? Socio-political factors and wars were the main causes of population movement. War interventions not only on the territory of today's Vojvodina, but also in wider areas, had a significant impact on the migration of population, then ethnic, religious, as well as other socio-political factors.

In addition to these factors, the migrations were influenced by infectious diseases, as well as the physical and geographical features of the area. The fertile soil, low terrain, easy settlement and house building, communication had a significant impact on population growth in Vojvodina since the 17th century. The settlement took place with planned colonization, but also with forced displacement of the population south of the Sava and the Danube rivers. Planned colonization was done by Viennese court for several reasons. Due to the economic prosperity of the area, they brought the colonists from Western (French), southern (Spanish and Italian), central (Germans, Slovaks, Czechs) and Eastern (Rusins, Bulgarians) Europe. However, apart from the economic character, these immigrations had a political character too (breaking up the Orthodox, especially the Serbian ethnic character in this part of the Empire). Many researchers have studied the migrations of the Imperial Palace to today's Vojvodina: Jojkić (1931), Džunja (1951), Jankulov (1961), Forišković (1970), Siricki (1971), Čakić (1982), Popović (1990).

The causes of migrations through the centuries have a similar character. Economic causes generally lead to light migrations that are not mass migrations. Most often participants are only individual families, that move slowly and in stages. These migrations last for centuries, mostly unnoticed. And these migrations were the ones that Cvijić called metanastasic. These migrations also changed the ethnic structure of the population. Migrations caused by war events mostly had a mass character and happened in a short period of time.

Cvijić divided the metanastasic causes of migrations on historical, psychological and economic. As historical and psychological reasons he cited: the migrations caused by the Turkish invasion, the influence of the Janissaries on displacement, migrations caused by the Austro-Turkish wars, migrations due to rebellion, hordes of Turkish hajduks as the cause of displacement, migrations due to religious persecution, the match between the Franciscan parishes as a cause of migration and resettlement

as the consequences of the wars for independence. As for the economic causes Cvijić stated: economic conditions for permanent emigration, climatic fluctuations as a cause of migration, migrations in stages, economic reasons in relation to other, serf regime, periodic or seasonal migration, as well as some accidental causes (Cvijić, 2011, 147).

Often the causes are intertwined. There is rarely just one cause that leads to emigration. In history, the most massive migration took place due to the invasion of the Turks, then due to the rebellion of the Christian population. Cvijić believed that these are historical reasons, because they are caused by historical events. However, these migrations were often accompanied by some psychological or moral motives. Migration derives from the development of national consciousness, when there is an internal insurgency towards the invaders. Due to personal and property insecurity, difficult economic situations emerged, hunger was present in many areas and these were the main factors of migration due to economic reasons. However, with the economic and psychological migrations, according to Jovan Cvijić, the initiators were difficult living conditions under the Turkish rule. And it was hard to determine what the ultimate driving force was that led to the decision to move out of the country or the place in which they lived. "The last impulse is often accidental: some unpleasant event in the home country, good reports on conditions in the country of colonization, there is a deserted land, the prospects for good earnings and so on" (Cvijić, 2011, 148).

Dušan Popović (1990) listed some causes of migrations that Cvijić did not single out as special. According to Popović, since the invasion of the Turks until the 18th century, the population migrated with their dynasty and nobility, during the war, voluntarily or forcibly, by direct agreement or based on the contract of wide layers with representatives of state authorities, as well as individually without any agreement. Among the Serbs from Raška, in the regions north of the Sava and the Danube rivers the first to move were the dynasty, then lower and high nobility. They settled down upon invitation, under contract or with the approval of the Hungarian kings. The properties of the Serbian dynasty on the territory of Vojvodina were significant because of the inhabitation of Serbian population. Those were the properties that were leaning on the ethnic core of our nation or in the immediate vicinity. These estates were usually populated by serfs of our nobility, therefore with Serbian people. After the fall of the Serbian state, there were major changes. Serbian despots became vassals of Hungarian kings. And wars between the Hungarians and Turks mostly influenced the movement of the Serbian population to the north which Cvijić characterized as historical causes.

The immigrations in Vojvodina during the first half of the 20th century had economic and political character. The formation of the new state, the Kingdom of Serbs, Croats and Slovenes, brought to emigration of the German population that constituted one fifth of the population of Vojvodina in 1921 according to census. A certain number emigrated after the First World War so in 1931 they constituted slightly less than a fifth of the population of Vojvodina. Migrants from the area south of the Sava and the Danube rivers came in their place, but the population of Vojvodina also got displaced. After the Second World War was the largest number of Germans that emigrated abroad so they accounted for less than 2% of Vojvodina's population that was recorded in the 1948 census (Đurđev, 1995). With the departure of the German population from Vojvodina properties and houses remained deserted. For economic reasons, in their places a majority of the Serbian population from the mountain regions of Croatia, Bosnia and Herzegovina, Montenegro, Macedonia, and from the southern parts of Serbia settled down there. Besides Serbs a great number of Montenegrins settled down too, but there were also sporadic cases of immigration of Croats and Slovenes. The emigration of Serbian population from the Dinara area in Croatia and Bosnia and Herzegovina had a largely political character, which brought to a weakening of the Serbian ethnic space in these republics. This organized migration immediately after the war was massive, although it did not occur during the war as it was in the previous period.

Postwar migrants eventually triggered a migration of a purely economic nature, which occurred during the fifties, sixties and seventies of the 20th century. In the beginning of the fifties, these migrations had agricultural character and were seasonal. The settlers were residents of the mountain region of the former Yugoslavia. For years, they came in the harvest season to work in Vojvodina, and then returned to their homeland. Among them were those who permanently resettled because of agrarian overpopulation in the domicile. And at the same time in Vojvodina the process of resettlement of the population from villages to cities started. The villages have remained deserted, there was not enough manpower, and machinery just began to develop. This resulted in the mass colonization of Vojvodina, particularly from Bosnia and Herzegovina (Ćurčić, 2006).

In the nineties of the 20th century there were clean, Cvijić would have called them, historical migrations. However, it is much better to characterize them as political. The background and ultimate goal of these migrations was ethnic cleansing of Serbian areas, Lika, Kordun, Banija, Eastern Slavonia, Bosanska Krajina. These migrations led to some changes in the ethnic structure of Vojvodina. After the Second World War, Serbs

made up about one-third of the population of Vojvodina, and at the beginning of the 21st century after the mass relocation, which took place during the 20th century, the area is dominated by Serbs, with two-thirds.

THE CONSEQUENCES OF MIGRATION

The consequences of migration are numerous and significant for the new environment and its whole population. In the new environment the immigrants received certain characteristics of the indigenous population, but also the indigenous population was to some extent influenced by immigrants. This largely depends on the characteristics and personality of the individuals themselves.

In metanastasic movements, the population did not move immediately from the mountain area to the lowlands, but gradually moved from the high mountain regions in the areas of lower altitude. With migrations, there was a change in the mode of economic activities of migrants, which was often a problem. The population of mountain regions was mainly engaged in cattle breeding, arriving at the lower altitudes, in addition to animal husbandry, with time they began to work in agriculture. The generations that migrated usually did not change the way of their economic activities, but their descendants did, the second and even third generation. Much bigger problems had those migrants who moved en masse and in a short period of time moved from the mountains to the lowlands. In such cases, they often sought undulating terrains in the lowlands that were in some way reminiscent of the country of origin. The first generations had major health problems and only later got adjusted. According to Cvijić's researches (2011), "People from Lika who settled on these plains here and there, survived just exceptionally because the air was suffocating them, and plagues decimated them".

In the new environment the immigrants, where possible, changed the names of settlements, or named certain parts of the village after the places where they came from, or after some characteristic toponym, by notable personalities from their native country. There are many such examples in Vojvodina: Velebit, Novi Kozarci, Sutjeska, Mladenovo, Lovćenac.

Mixed marriages between immigrants and the indigenous population with the first generation of immigrants were very rare, but in subsequent generations they became increasingly common. The immigrants often kept their dialect after their arrival, which eventually disappeared. Immigrants from Montenegro kept their dialect for the longest.

How fast the immigrants accepted characteristics of indigenous peoples depended on the number and share of immigrants in total population. Where immigrants dominated in the settlement it was more difficult for the immigrants to change themselves than in those neighborhoods where indigenous population dominated. Over time, the next generations accepted the cultural and social characteristics of the indigenous population or overlapping of the characteristics appeared and creation of new characteristics of nations happened that were made up by the features of indigenous and immigrant population.

The relocation of migrants during the 20th century had different consequences. Adapting to the new environment, climate, economic conditions, was very difficult to many people, and they returned to their country of origin. So after the Second World War, of 237,599 immigrants 21,293 persons returned to their country of origin. The immigrants were forced to accept big changes, both natural and social features, in particular in the way of farming. In their country of origin they were engaged in animal husbandry or extensive farming, and in the country of destination they were farmers.

The immigrants at first influenced the demographic changes, population growth, changes in gender structure. The expectations were that the immigrants in Vojvodina would affect the increase in birth rate; however, they quickly gained the characteristics of the indigenous population, so there were a smaller number of births among the immigrants too. The immigrants soon got involved in the migrations of village - town, and the development of Vojvodina's population returned to its former flows.

Similar was the situation with immigrants, refugees at the end of the 20th century. There were hopes that the refugees would save Vojvodina's population, however, they only influenced the population growth from 1991 to 2002 and the structure of the population had no significant changes, there wasn't an increase in the birth rate (Bubalo-Živković & Plavša, 2001). Already by the next census, the refugees had no impact on the growth of the number of population.

The consequences of the migrations of refugees were extremely difficult, particularly for those who during the war lost someone, who lived in collective centers for a long. This had serious psychological effects on the migrants. There were those who could not get used to the natural and social environment of Vojvodina, and returned to the country of departure despite all the inconveniences and the difficult position that they knew they would have upon their return. Emigration in a third country is the consequence of the inability to adapt to life in Vojvodina, but also economic and political uncertainty.

CONCLUSION

With metanastasic movements a lot of Serbian population migrated from the south of Serbia to the north. Cvijić warned of the danger of displacement of population from the southern parts of Serbia, especially from the region of Novi Pazar and Kosovo and Metohija. Some areas were left without population. This process he called "disserbianating of Metohija and Kosovo" (Cvijić, 2011, 185), and he observed this kind of process also in western Macedonia and Old Serbia. It reduced the proportion of the Serbian population in these areas, and in some places it was reduced to zero (the Serbian population was completely moved out). The displacement of the population of Kosovo and Metohija continued in the 20th century and the process was almost completed at the end of the century. Over time the Albanian population moved into the empty areas which prevailed. North of the Sava and the Danube the share of Serbian population increased and there was a change in cultural and social character of the population of that area. On the other hand in this century there was a displacement of Serbian population from western areas too, from Croatia and some parts of Bosnia and Herzegovina. With migrations that lasted several centuries the Serb population was displaced from the areas where they used to constitute an ethnic majority and ethnically clean space.

Centuries-old migrations have led to an increase in the proportion of the Serbian population in the total population of Vojvodina. Immigrants from Bosnia and Herzegovina, Croatia, Montenegro, Macedonia, southern Serbia, influenced the social change in Vojvodina's population, particularly in settlements where there was a larger number of immigrants so that there was a change of the indigenous population and the formation of population which had the characteristics of both immigrants and indigenous people, or immigrants accepted the habits, customs of the indigenous population, which is a much more common case.

The consequences of migrations from Cvijić's researches and during the 20th century are similar. Difficult adjustment of the immigrants accompanied both migrants and there were always those who returned. Even after the Great Migration of the Serbs at the end of the 17th century there were those who returned to the area of the Turkish Empire, because of the difficult position in the area of the Austro-Hungarian Empire. Place names were changed in the 20th century, as well as in earlier migrations. The new settlements were formed at the time of the arrival of refugees (Busije between Batajnica and Ugrinovci), as there were cases where migrants during the 17th and 18th centuries formed new settlements. Economic ad-

justment of both was hard, as the economic conditions changed before and during the 20th century.

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DEVELOPMENT OF SCIENTIFIC APPROACHES IN THE GEOGRAPHY OF SETTLEMENTS IN SERBIA

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ABSTRACT: Scientific research of settlement structures, their genesis and evolution, are based on the Jovan Cvijić's anthropogeographical concept. The geographical approach to this issue has changed over time, permeated with other related scientific disciplines, in accordance with the changes of the basic determinants of the settlement development. However, the differences and causes set in the Cvijić's work in the urban and rural studies have set the stage for the current scientific research of the settlements. The paper describes the evolution of scientific approaches in research in this field in Serbia, from Cvijić's anthropogeographical approach to the complex, applicative and interdisciplinary approach. It follows evolution of settlement geography of as a dependent and independent scientific discipline, in the sense of science and education. The authors analyzed approximately 500 scientific papers for a period of about 120 years. The systematization of the settlements was accomplished according to the research period, spatial frame, but in the first place according to the approach and research method.

Key words: settlement, geography of settlements, Jovan Cvijić, scientific method and approach, Serbia

INTRODUCTION

The importance, values and actuality of scientific work of Jovan Cvijić are evidenced by numerous articles and publications dedicated to the life and work of scientist as well as evident citations of his work by the researchers of different scientific disciplines (geographers, geomorphologists, geologists, sociologists, demographers, anthropologists, ethnologists, ethnog-

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rappers, historians, lawyers, etc.). In an extensive scientific opus of J. Cvijić anthropogeographical observation has an important place, although it was considered in the beginning as a "sideline part of physical-geographical and geological studies" (Cvijić, 1991, 19). Hence, they are not in the primary focus of exploration, observations made during terrain research and curiosity for scientific knowledge of phenomena and processes in Serbia and in other parts of the Balkan Peninsula, he expands scientific horizons and studying of the physical-geographical phenomena and processes completes with the anthropogeographical and ethnographical issues (Vlahović, 1991; Jovanović, 1949; Radovanović, 1957). At the end of the 19th and early 20th century he established a scientifically bases for the study of settlements and population ("Cvijić's anthropogeographic school", according to Lutovac, 1965, p. 2), which qualify, above all, multidisciplinary and systematic approach to work, terrain work and observation (Grčić, 2001; Rajković & Miletić-Stepanović, 2012; Čulibrk, 1996), and elaborated in the *Instructions for the study of villages in Serbia and other Serbian countries* (Belgrade, 1986), *Instructions for the study of villages in Bosnia and Herzegovina and in Old Serbia and Macedonia* (Belgrade, 1898), *Instructions for the study of settlements and psychological characteristics* (Novi Sad, 1922). The results of the research of Cvijić's and his collaborators expose in the edition *Settlements and origins of the population*, published by the Serbian Royal Academy (1902) and Bulletin of the Ethnographic society (1912) and in other scientific and professional publications, and a kind of synthesis of the whole Cvijić's work of this phenomenon is formulated in the capital work *Balkan Peninsula and Southern-Slavic countries* (1918 in French; 1922; 1933 in Serbian). Through the lens of interrelated geographical conditions, socio-historical factors and cultural influences, ethnic predisposition of population, he explains the position and different types of urban and rural settlements, respecting their genesis and physionomy.

The authors have presented the concept of Cvijić's anthropogeographical school, the evolution of geographical scientific thought in the study of settlements through theoretical and methodological settings. They pointed out the presence and influence of Cvijić's work in current geography of settlements. Within the context of the paper, are analyzed the extensive fund of scientific papers in the field of settlement's geography for a period of Cvijić's Instructions for the study of the settlement until today. The systematization of scientific papers is done through four dominant scientific approaches: anthropogeographical, applicative, complex and interdisciplinary.

THE DEVELOPMENT OF GEOGRAPHY OF SETTLEMENTS IN THE SPHERE OF SCIENCE AND EDUCATION

In the Serbian scientific literature is evident division of the author's opinions about studies of settlements in the form of specific, individual, geographical discipline, apropos component areas within other related disciplines. Particular authors (Carić, 1973), consider that the geography of settlements is an integral part of population geography, a special part of economic geography, that is, geography of settlements and population geography falls within the environment (Kostić, 1978; Jovanović, 1988a). On the other hand, the opposite opinions have the authors who suggest recognition of settlement study as a special geographical discipline, geography of settlements and ekistics (Stamenović, 1991; 2001; Stamenković & Bačević, 1992). As an integral discipline, it combines the categories of natural and social character with all their regional effects and implications in geospace. Stamenković (2001) emphasizes that emergence of geography of settlements dates from the late 19th century and that discipline have passed to the present day a phase of an integrated and self-development.

The development of scientific geographical thought has gone from observation and description, to explication and current application development phase, or how Ćirić (1966, 16) notices "its path and orientation from explication towards application". These phases are successively alternated each other, not assuming prior exemption, but their upgrade on a scientific basis and practical purposes. Description in geography of settlements serves as a tool for learning of settlements development, and to some extent their systematization (Stamenković & Bačević, 1992). This method in geographical sciences received the scientific connotation if it relies on the dialectical-logical processing (Tešić, 1977). On the other hand, explicative geography is interested in the interpretation and analytical penetration into the essence of phenomena, revealing the links between phenomena. Essentially it is genetic, comparative, analytical, synthetic, inductive and deductive, but primarily materialistic and dialectic (Tešić, 1977). A one of the founders of scientific explicative thought in geography is considered Jovan Cvijić, who goes beyond the description and uses scientific explanations, emphasizing causality and consequences, as well as the relationship between phenomena (Ćirić, 1966). Geography as an empirical science in Cvijić's period was a cognitive and educational, but is absent its applicative function. The transition from the descriptive methodology to prediction methods and management of geosystems, takes place parallel with the transition from cognition to applied geography (Grčić, 2005).

Applied Geography in Serbia since the mid-20 century, in the focus of its interests, sets the topic of active and functional transformation of space (Ćirić, 1966). Relevant impulses of the development of geography of settlements, in parallel with the development course of geographical scientific thought, are considered processes of industrialization, urbanization and dynamic urban development (Stamenković & Bačević, 1992), which have caused the transformation of geospace and the use of research results of this discipline in practice. However, with the development of applied geography, and its wide use and the interference of other scientific disciplines in the study of geographic phenomena, we should be cautious about the potential misuse of geography in geopolitical and other fatalistic purposes (Ćirić, 1966, 1981; Jovanović, 1988a). Additionally, it still represents progressive effort in a positive direction, with more intensive use of research results, especially in the domain of urban, rural and spatial planning (Stamenković & Bačević, 1992).

In recent geographical science, interdisciplinary and multi-disciplinary approach gains relevancy more and more. In the written material, settlements are observed from the aspect of many scientific disciplines, with one discipline dominates, depending on the issues of research. Since the settlements are elements of the geographic surrounding which develop in space and in time, it is not surprising that the methods and techniques are being diverted to multidisciplinary and interdisciplinary approaches. Due to the fact that the settlements are a complex phenomenon, interdisciplinary approach in the geography of settlement developed as the need for unification of diverse scientific views and synthesizing the results of such fragmented researches in one scientific discipline. Therein lays the advantage of geography of settlement as synthetic and systematic discipline, because understanding of the settlement from the perspective of some partial, specialized sciences through a mosaic of fragmented researches would be totally illusory and without complex integrated idea of the settlements and their characteristics (Ćirić, 1987; Stamenković, 1991).

Already in Cvijić's methodological research procedure is implicit incorporated systematic approach, applied to anthropogeographical-ethnogeographical process (Grčić, 2004). Development of complex geographical approach is connected with the development of general theory of systems (Stamenković & Bačević, 1992). Geosystems are spatial systems, which emphasizes the spatial components in the study of settlements. Theories of systems follow the application of quantitative analytical methods. With mathematization the geography of settlements approached closer to the deterministic and stochastic systems. In this manner, it is possible to use

methods of mathematical statistics in geography to interpret highly complex and polyvalent relations in certain parts of the geosystems (Jovanović, 1988a).

It is interesting to mention that although the science evolves, the definition of settlements in Serbian literature has been used since 1952, and is "settlement is special anthropogeographical territorial unit with special name regardless of the number of houses, in which are highlighted four groups of features: population, territory, name of the settlement and a number of houses" (Ban, 1970, 13). For the purposes of use in other scientific fields (spatial planning, tourism, urbanism, etc.) requires the introduction of additional criteria for the definition of the settlement.

There are indications to access the phenomenon of settlements from the standpoint of more comprehensive science - ekistics, whose founder is Doxiadis. Followers of this orientation consider that partial approaches to the study of settlements create confusion in the field of perception settlement structures. On the other hand, they emphasize the need to strengthen interdisciplinary work regarding settlement's research, which would be reached in ekistics through the establishment of the basic elements in her starting point: nature, man, society, suprastructure and infrastructure (Stamenković, 1991).

Cvijić established the concept of the studying of settlements, which has not been exceeded till now (Stamenković, 2001). In the spirit of Cvijić's methodology of anthropogeographical researches, has been published a considerable number of scientific works - monographs, scientific papers, studies and reports. Influence of the Cvijić's work on research of settlements has been very strong. Pleiades of his followers continued researches, and they modify according to specific features in particular areas of research, and improved his Instruction: Bukurov B. with the study of settlements in Vojvodina (Instructions for the study of settlements, 1955); Trifunovski J. in Macedonia and southern Serbia (Contribution to the study of rural settlements in the Republic of Macedonia, 1973); Ćirić J. from a sociological point of view (Instructions for sociological study of the rural settlements, 1975); among the first complex publications which perceive from different angles rural settlements – Our village (ed. Stojadinović, 1929); Kojić B. from the aspect of the architecture of the rural settlements (Rural architecture and tourism, 1958; The rural settlements of Serbia, 1975); Kostić M. (Contribution to the modern concept of anthropological studies of settlements and population, 1978); the most important edition *Settlements and origins of the population*, unique in the world's geographical and ethnographical literature, which is a continua-

tion of Cvijić's work and his followers (Stamenković, 2001, Grčić, 2004); Geographical Encyclopedia of settlements, Faculty of Geography (ed. Stamenković, 2001) and others. Considering on differences in approach, the framework of observation and research methods, the topic of settlements is an integral part of the scientific-research activities of contributors of the Geographical Institute "Jovan Cvijić" SASA (Savić O., Popović M., Kostić M., Radovanović M., Jovanović R., Veljković A., Stojanović B., Tošić B., Popović I., etc.) and was presented in editions of the Institute (Special editions and Journal).

At the same time there was a need for internal differentiation of the geography of settlement into the subdisciplines, according to the type of settlements. Differentiation flowed in the direction of urban, rural and applicative geography, which was followed by the development of theoretical and methodological opus, as well as the orientation of authors in scientific works.

Development of geography of settlement as an independent science went parallel in educational and institutional system. In the Serbian science, geography of settlement is developed independently since the 1970s. From 1966 to 1971, on the geographic studies in Belgrade there is a subject Geography of settlements and population, but within the geography of the population, and from then it develops as an autonomous discipline (Stamenković, 2001). Strengthening of its subdisciplines had an impact on the scientific teaching program in higher education, which has established in different faculties: Faculty of Geography (spatial planning, rural and urban geography), Faculty of Architecture, Faculty of Agriculture, Faculty of Economics, Faculty of Sociology, etc. At the same time, the settlements are in the focus of scientific research of the institutions and scientific bodies that pay special attention to this issue (the Committee for the village of SASA, Institute for village studies, Serbian society for rural sociology, Balkan association for rural sociology and agriculture, etc.).

DEVELOPMENT OF THE SCIENTIFIC APPROACHES AND METHODS FROM THE PERIOD OF JOVAN CVIJIĆ UP TO DATE

The study of the settlements in the Cvijić's works relied on anthropogeographical, sociological and ethnographical theories and methods respecting historical frames and conditions. The systematic study of the settlements began in 1889, during Cvijić's traveling through Eastern Serbia (Ćulibrk, 1996). Theoretical assumptions and research questions for the issue of settlements were performed in the work *Instructions for the study of villages*

particularly for the territories of Serbia, Bosnia and Herzegovina and Old Serbia and Macedonia, in 1896.

His research on the issue of settlements and populating is achieved through connection of physical and human geography. His conception of the geographic science included sociological, historical-materialist and dialectical approach to the nature, society and culture (Ćulibrk, 1996). Hence, it follows that his theoretical and empirical work has been directed toward the man, in space and society. Anthropogeographical school of Jovan Cvijić is the first school, which examined the man as geoagent (Kostić, 1978). He gave to the geography and anthropogeography a sociological note. In Cvijić's it has overcome one-sidedness by applying various methods. He dismissed romanticism and idealism in science, trying to realistically determine the legality of the development of life and world in a particular space and time (Vlahović 1991, 9). His anthropogeographical approach is a mixture of natural and sociological methods and, in accordance with this, he used at the same time natural basis in study of phenomena that he researched, as well as methods of social and human science: direct observation, psychological and ethnopsychological profiles, geographic-comparative method, historical-genetic, cartographical and graphical, statistical and method of systematization, classification and typology, which is especially important in the study of settlements (Grčić, 2004). Cvijić's striving for massively testing and numerical results for better comparability of data was the basis of anthropogeographical research (Ban, 1968).

Typology of settlements set up by Cvijić was a novelty in the world geographical science and the forerunner to many later efforts in this area of domestic and foreign researchers. His typological method is characterized by a certain generalization at the regional level. As pointed out by Radovanović (1965, 104) Cvijić has allocated basic types and varieties as genetic categories, then explaining with their social, economic, cultural and historical features of the settlement morphology and thus he partly formulated the methodological basis for the typological classification of rural settlements, from the aspects of their position, genesis and morphology.

Studying the settlements, Cvijić has sorted this issue in *Instructions for the study of villages* into seven large unities (the position of the settlement, type, house, yard and kitchen garden, economic buildings, stories and interpretations of the name of the settlement, the establishment of settlement, early settlements and their traces, the occupation of the population). This was the basis for systematization and processing of material

on geographical and socio-historical characteristics of the Balkan population. He identified the main factors and principles in the position of small towns such as natural conditions, geographical and spatial regulations, along with historical circumstances and political events, replacement of the cultures and changes in communications. With a similar analysis he has determined for rural settlements general conveniences (terrain plastic, communication, fertility, economic conditions) and specific conveniences, on which depends their development. Cvijić established foundations to its differentiation into two main subdisciplines: urban and rural geography, which maintain and in contemporary approach.

Development of the geography of settlements, from its foundation as an independent scientific discipline to the current stage of development is characterized by continuous improvement of research methods, techniques, aspects and approaches. Stamenković and Bačević (1992) distinguish basic scientific and research approaches in geography of settlements: descriptive and mechanistic, complex, pragmatic, as well as multi-, inter- and transdisciplinary approaches that are based on cooperation with other sciences whose subject of research is related to certain segments or the entire settlements.

During the systematization of scientific papers that are focusing on the settlements, the authors have analyzed an extensive scientific factography and bibliography of authors in various scientific epochs, from the late 19th century to the present. In fact, the initial year of the research is taken 1896, which is considered the cradle of the idea of the study of settlements, initiated by systematic and ingenious work of J. Cvijić, which is the basis of today's recent geography of settlement. In the analysis, the authors chose bibliographic list from the library of the Geographical Institute "Jovan Cvijić", SASA. Approximately 500 scientific papers have been processed for a period of about 120 years, whereas a central issue is settlement, or some their segment. In the analysis of scientific papers were not treated papers in which the settlement is a spatial determinant. The systematization of the settlements was done according to the research period, spatial frame, but in the first place according to the approach and research method. For basic approaches the authors have taken: 1. *anthropogeographical*, modeled by Cvijić's approach to studies of settlements; 2. *complex*, which comprehensively observes the connection between settlement and its environment, integrally including physical-geographical and socio-geographical aspect of the study and which is in its conception closest to the systematic approach; 3. *applicative or problematic*, which is processing the settlement from the specific aspects (demographic, phys-

ical-geographic, economic, historical, ethnographical, touristical, agrarian, architectural, urbanistical, from the spatial planning aspect, etc.); 4. *interdisciplinary*, which involves the research of settlements through the cooperation of various scientific disciplines which in their own case study touch on the settlements as a whole or some of its parts.

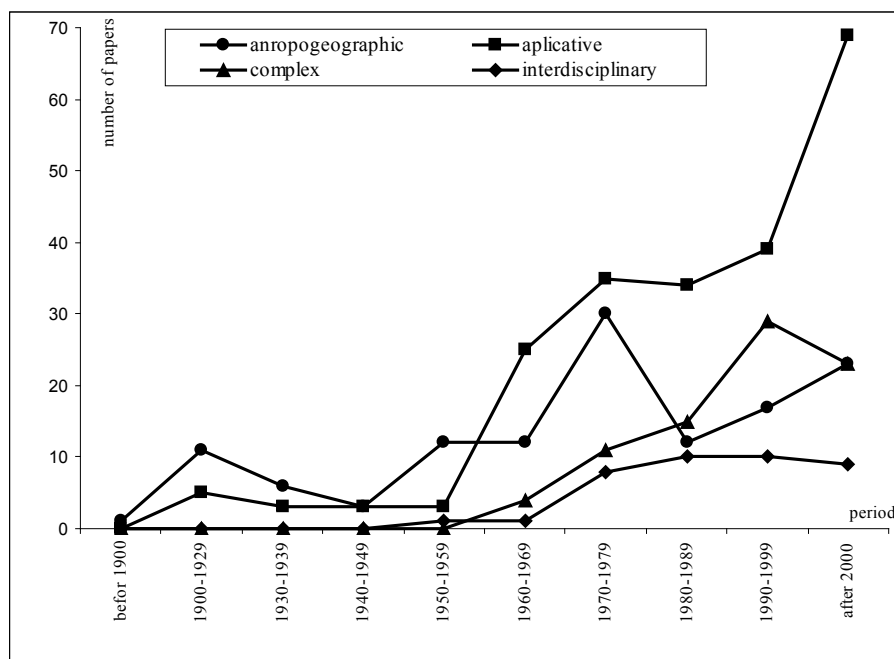


Fig. 1. *Scientific papers according to approaches in the geography of settlements in the last 120 years*

Over a period of about 120 years for which was done the systematization of scientific papers and analysis of theoretical and methodological approach in the study of settlements, different stages of development geography of settlement were observed. They were drew with the dominant approach and according to the number of papers by ten year period, it is easy to notice turning moments in which occur change and overlap scientific approaches (Figure 1). Phase of anthropogeographical approach in the study of the settlements has marked the development of geography of settlement and geographers in the mentioned study are still inclined and devoted to Cvijić's anthropogeographical school. So, in recent geographical research is common anthropogeographical access in some form. The beginning of the applicative phase, characterized by the development of subdisciplines of geography of settlement and application of research results, which also af-

fect other geographic disciplines, is difficult to strictly define. In the papers of Cvijić still can be found researches dedicated to the villages and small towns separately, but also the roots of sociology, ethnography, economic and agrarian geography (Popović, 1967). It also indicates the necessary interdisciplinarity in the field of the settlements issues. However, for the develop of the applicative stage is important period of intense connection of geography of settlements with various areas of social practice, especially with spatial planning and urbanism, in order to use its results (Stamenković & Bačević, 1992; Stamenković, 2001), particularly from the 1970s and 1990s, when the practice of spatial planning is developing progressively and normatively regulating. For this reason, it is a phase that has given the largest number of scientific papers in the field of geography of settlements (Table 1). Complex or system development phase begins by introducing system theory in geography, gradually from the 1970s, for whose contribution was particularly meritorious papers of M. Radovanović, A. Veljković and R. Jovanović. Interdisciplinary phase characterize a recent era of geography of settlement. Synthesizing of knowledge of different disciplines becomes a kind of feature of geography of settlements. The evolution of scientific approaches in geography of settlement was described and with a structure of scientific papers over a period of 120 years, which indicates which of the approaches has left the strongest influence on the geographical thought in the domain of the settlements and which of the approaches are in fact still developing (Table 1).

Table 1. *Structure of scientific approaches in the geography of settlements*

Approach	Initial period (from)	Papers (%)	The most significant authors
Antropogeographical	1896	26.36	Cvijić J., Đurić V., Bukurov B., Ćirić J., Đorđević T., Kostić M., Ristić K., Trifunovski J.
Applicative	1960	45.81	Đorđević D., Jaćimović B., Kojić B., Popović I., Ribar M., Savić O., Todorović M.
Complex/ Systemic	1970	19.25	Jovanović R., Radovanović M., Perišić D., Veljković A., Tošić D., Grčić M., Stamenković S.
Interdisciplinary	1980	8.58	Ilić J., Jaćimović B., Todorović M., Vujević S., Petovar K., Pušić Lj. etc.

Source of data: Elaborated by the authors

SCIENTIFIC ASPECTS AND METHODS IN THE CONTEMPORARY STUDY OF SETTLEMENTS

Cvijić's anthropogeographical approach was held to this day, although there were new methodological paradigms in geography (Grčić, 2004). In the current stage of development of geography of settlement, as pointed out by Radovanović (1965), we cannot be satisfied with just this method and approach to research of settlement, because contemporary theoretical and practical requirements are not identical as they were in the age when first instructions were written for the study of settlements and population.

In general, contemporary science is turning toward applicative direction. Theoretical and methodological concepts, categories and classification of methods in geographical science are intertwined with related disciplines, but increasingly seek and participation of a new technologies. On the other hand, individual problems in urban or rural environments are directing study of settlements from the general geography, to differentiated areas, for example urban and rural geography, urban ecology, urban and rural sociology, economic and agrarian geography, spatial planning, etc.

In the recent period, from the 1970s, population and economic activities in the settlements become attractive for the research because, as such, are contributing in majority to the transformation of space. Dedicating more attention to functions and activities in the settlements leads issue of the study of settlements toward economic sciences and its deeper differentiation and methodological specialization. New methodologies lead to the fact that geography should be mathematized, but there is no doubt that the wrongly directed and set mathematical research will give wrong results (Carić, 1973), because geography cannot be studied in the cabinet's conditions. Therefore, as Radovanović states (1965, 97) "it is necessary to take advantage of exceptional scientific heritage which gives us Cvijić's school ... with abundant demographical, sociological and economic documentation that was not available to Cvijić". Systematic approach to the study of settlements allows observation in the context of geospatial systems. Consequently, the approach in the researches is complex and comprehensive, by other scientific disciplines.

Geography is now turning to problem oriented processing of complex topics. Quantitative character of geographical processes is expressed by changes of the quality of geographical objects, changes of the spatial characteristics through the dispersion, allocation and concentration of settlements as objects of geosystems and changing of relations among them (Jovanović, 1988a). New fronts in the study of settlements, which relies on

the quantitative character of geographic phenomena and processes, are developing in parallel with the modern high technologies, geographical information systems (GIS). In this regard, the analysis of the variables is facilitated in the study of settlements. However, although the current geographical science calls for integrating tendencies, it is evident profound differentiation of geography. The model-based paradigm and use of GIS technology leads to a specific specialization of geographers (Grčić, 2007).

Contemporary geography of settlements is necessary to observe through the development of its subdisciplines (urban and rural geography), in whose direction took place the gradual development of theoretical and methodological mechanisms. Such a division seems quite logical, considering the demographic polarization and concentration of functions, power and capital in urban areas, on the one hand, and rural areas, which represent the antipode of urban lifestyle and functioning, on the other hand.

The city as the most dynamic element of geospace was, from the beginning of the 20th century, studied through the lens of anthropogeographical and geographical, ethnological, social and historical aspects, and relying on the descriptive and explicative research methods. Then an applicative moment in the study of urban areas reflected exclusively in the statistical documenting, that is, in registration of settlements, their names, spatial determinants and size. In the Serbian geographical school, urban areas are intensively studied from the second half of the 20th century. Since then, approaches and methods in the study of urban settlements were developing in parallel with the processes and stages of urbanization.

Veljković (1988, 179) states that "the study of cities goes through the unclear set criteria for determining the geographical approach to the issue of the city and the different approaches and ideas from other disciplines, such as economy, sociology, architecture and urbanism". Until now, there is no unique theory or approach to the study of cities. Some authors have observed the city with cartographic recognition of space (Savić, 1987), while others put the emphasis on the study of the function as the main focus of the development of city and expansion of spheres of influence (Veljković, 1991; Tošić, 1999; Tošić, 2001). The aspirations to classify and rank the urban settlements were subject of numerous scientific papers (Bukurov, 1973; Kojić, 1973, Savić, 1977; 1980; Jovanović, 1988b; Djordjević, 1989; Veljković, Jovanović & Tošić, 1995; Tošić, 1996).

Today, the characteristics of urban systems are observed by hierarchical or vertical, spatial or horizontal and temporal dimension (Tošić, 2001). This was made possible by introducing a systemic approach that allows the width in the research of urban areas, urban structure, its ele-

ments, spatial organization, legality and regularity in the development of cities. It comes down, mainly, on the functional-spatial, population-spatial and morphological structure in urban areas. Modern theoretical paradigms set the urban geography in the center of regional researches, in that way was achieved stronger connections with the regional geography and spatial planning. Systematically, a complex approach has found the use in various disciplines that have the prefix *urban*, but it is more evident in the use of spatial, apropos urban planning (Veljković, 1988).

The rural study in Serbia has a long tradition since V. Karadžić, S. Vukosavljević, J. Cvijić, V. Karić and others (Todorović, 2007), but the development of rural geography in Serbia has to be linked to the work of Jovan Cvijić, which had a significant impact and other scientific schools in Europe. Approach to the rural studies has been changing through different periods, from the behaviorist, functionalistic, systemic analysis, political economy, sociological, network of actors, post-structuralism, post-productivism, etc. (Marsden & Adriansen, 2004; Todorović, 2007). Rural studies, as well as the development of rural geography in recent conditions went far beyond a scientific discipline and one specific time and social order in the world and in our country. Woods (2012) is addressing vividly that progress as the bifurcation of rural researches. Expansion of the research approach in rural geography in recent conditions certainly is affected by a concept of integrated rural development, which puts emphasis on the multifunctional character of rural areas and the polyvalence of rural scenes.

From the beginning of the study, rural settlements are the subject of interest of various sciences and its subdisciplines. Particular authors observed the rural settlements through the complex social relations (Vukosavljević, 1983; Ćirić, 1979;), the development of certain segments of the rural economy (Lutovac, 1964; Jaćimović, 1989; Stepić, 1991; Bogdanov, 2007) demographic characteristics (Spasovski & Ilić, 1989; Radovanović, S., 1999; Mihajlović, 1994; Vojković & Todorović, 1998), traditional architecture (Kojić, 1958; Simonović & Ribar, 1993; Ribar & Dimić, 2005), etc., while in the contemporary rural study is paid attention to the ideological concept of revitalization (Stamenković, 1996; Mitrović, 1996) and the reconstruction of the rural settlements (Ribar, 1996). That kind of research was increasingly difficult to distinguish, so the integration of the results in one scientific discipline was inevitable. Recent rural research is moving towards specialization of method that is used, while in rural geography is noticeable opposite process, generalization of researches and connecting with other disciplines that are approaching to the rural settlements with fragmented insights, specialized technological and methodological

approaches. The rural settlement, as a subject of research is marginalizing gradually, apropos is becoming determinant in the study. Particular authors recognize rural geography as a synthetic revitalized discipline, which respecting multifunctional character of rural settlements, is experiencing in contemporary conditions a renaissance (Stojanov, 1996).

One of the main tasks of the contemporary geography of settlement in the world and in our country is typological classification of settlements and typology of rural areas, based on appropriate methods of qualitative and quantitative analysis (Radovanović, 1965). It is a very old question in the Serbian science, but the method has been changing gradually from a simple, based on the basic features of the settlement (Cvijić, 1991; Macura, 1954; Kojić, 1958; Radovanović, 1965; Djurić, 1987; Bukurov, 1983; Jovanović, 1988b; Stamenković & Bačević, 1992; Ribar & Simonović, 1993; Tošić, 1996; Tošić, 1999; Stamenković, 1999, etc.), to the more comprehensive, according to the current conceptions and methods of identification of rural areas in the world (Meredith, 2006; Zakić & Stojanović 2006; Estratoglou, Bogdanov & Meredith, 2007; Ratkaj, 2009).

CONCLUSION

In the observed period, from scientific founded approach in Cvijić's anthropogeographical school, the geography of settlements is passed through several development phases. Each of separated scientific areas is characterized by dominant scientific approach and methodological mechanisms. Four dominant approaches are identified: atropogeographical, applicative, complex or systemic and interdisciplinary. It is difficult to set the boundaries and determine development period of these scientific approaches. Evolution of approaches in the geography of settlement is possible to be defined by structure of scientific papers, which indicate which of approaches had the strongest influence on geographical thought. Unsurpassed Cvijić's concept in the anthropogeographical studies left the mark on the development of geography of settlements, so scientists handle with the mentioned methods in the recent research, too. With transformation of economic conditions and geospace, there is need for using scientific knowledge in a domain of settlements, and applicative phase of the geography of settlements would be required concept of studying. The mentioned approach exists in recent geography, but it is supported and superposed by knowledge from other disciplines (interdisciplinary) and observed spatial phenomenon and problems (complexity). However, in science network is evident dilemma which is related to a question of future development of geography of settlements, its essence and disciplinary subdivision, methodological speciali-

zation and cognitive fragmentation and generality. This is the question for the future generation of geographers. They should find response and take responsibility for further theoretical and methodological development in the geography of settlements.

ACKNOWLEDGEMENTS: This paper presents the results of research on the Project 47007 funded by Ministry of Education, Science and Technological Development of the Republic of Serbia.

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THE MEDITERRANEAN BRIDGE FOR “ASYLUM SEEKERS”

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ABSTRACT: Immigration to the Northern Mediterranean coasts is a phenomenon that has become relevant in the last few decades and has been lately impacted by an exceptional flux of citizens from countries of North Africa, mostly generated by the civil war in 2011 in Libya, the political turmoil in Egypt, and the Maghreb. Wars, conflicts, persecutions, and human rights violations have forced people to leave their homes, resulting in worldwide displacement. The reaction of countries globally, including EU Member States, to the worst refugee crisis since World War II has been a “shameful failure”, with the bulk of responsibility falling on a handful of countries. Asylum seekers are accepted, according to the Geneva Convention, and hosted in the first State they arrive to, according to the EU Dublin Regulation. This creates a conflict among EU States which try to avoid that the immigrants enter, since the process of recognizing the political rights is long, expensive and time consuming, due to the fact that there are some suspicions on the reasons for migration and fear of the risks of terrorism.

Key words: Africa, migrations, wars, asylum seekers, boat people

INTRODUCTION

The last quarter of a century has seen a flowering of research on migration and immigration. The major topics include immigrant assimilation and the impact of immigration on public expenses (Buchan, 2006). Immigration has been, and still is, a hot political topic, degraded by religious beliefs and manipulated by corruption (Hatton, 2014, Zincone; 2006, Lipton, M. 1980). In Europe the topic has been fostered by the rapid growth of immigration itself after the Arab Spring (Hatton, cit., p. 43). Immigration to the Northern Mediterranean coasts is a phenomenon that has become relevant in the last few decades and has been lately impacted by the exceptional flux of

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citizens from countries of North Africa, mostly generated by the civil war in 2011 in Libya, the political turmoil in Egypt, and the Maghreb (Del Boca & Venturini 2005; Zincone 2006; Dalla Pellegrina et al., 2014). Every day the media are speaking about boat people who afford the sea, risking death to join the European Mediterranean States whose population is fearing on how to sustain such a multitude in times of economic crisis. In fact it is not more only question of immigration, it could be called invasion.

The continually increasing number of boat people arriving from Africa, directed to European countries have raised concern about problems and tragedies at the front door of Europe. Johnsen, a representative of Norway at EU Parliament, expressed in April 2015 the common shock caused by the incidents in the Mediterranean, whose situation is getting worse and publicly asked “Who benefits from luring people into these vessels? It is the ruthless trafficker. The people who take payment and benefit must be brought to trial, because one day they traffic humans, but the next day it will be weapons, and the day after it will be drugs”. The fact is that our security forces know who they are, confirmed by the fact that they admitted that the four kidnapped Italian in July 2015, were not sequestered by them, but by unknown bandits. Fataliyeva, at the same day at EU Parliament noticed that the same events are interpreted in absolutely different ways, depending on when they happen. “Why in some cases- she asks- are victims of cruelty, ethnic and religious intolerance, territorial claims and fights for world power not recognized, whereas in other cases victims of wars are ranked as martyrs? Historical events cannot be subject to change based on certain political interests”...“where are those who call themselves human rights defenders?” (2015)

Hatton (2009, 45) evokes the evidence on the national effects of immigration hordes. He remembers that one was the repatriation of the Algerian *pieds noirs* to France in 1962; another was the *retornados* from Angola and Mozambique to Portugal in 1994–6 (Carrington & di Lima, 1996). According to Hunt (1992), and Hatton (2014) these immigration shocks seem to have substantially reduced average wages despite being interpreted to the contrary. In fact that was the goal of slavery in USA. Another ‘natural experiment’ is evidenced by the influx of Russian Jews to Israel when the Soviet Union lifted its restrictions on emigration late in 1989 (Hatton and Williamson, 2005, 299–302).

THE INCREASING NUMBER OF REFUGEES

“The United Nations High Commission on Refugees’ (UNHCR) Global Trends Annual Report 2014 has revealed that worldwide displacement is at

the highest level ever recorded since detailed record-keeping began. Wars, conflicts, persecutions, and human rights violations have forced people to leave their homes, with over 59.5 million people exiled by the end of 2014, compared to 51.2 million a year earlier, and 37.5 million a decade ago.

In particular, UNHCR registered 19.5 million refugees in 2014 (marking an increase from 16.7 million in 2013), 38.2 million internally displaced persons (compared with 33.3 million in 2013) and 1.8 million people awaiting the outcome of claims for asylum over the past year (against 1.2 million in 2013). <http://www.archive2.com/?u=8e3ebd297b1510becc6d6d690&id=56e325387d#UNHCR>

Based on those figures, UNHCR estimates that an average of 42,500 people are forced to leave their home every day, and that one in every 122 humans is either a refugee, internally displaced, or seeking asylum.

“The UN High Commissioner, António Guterres, called for an “unprecedented humanitarian response and a renewed global commitment to tolerance and protection for people fleeing conflict and persecution” in this “age of unprecedented mass displacement”. He notices that “it is terrifying that on the one hand there is more and more impunity for those starting conflicts, and on the other there is [a] seeming utter inability of the international community to work together to stop wars and build and preserve peace” (*ibidem*).

These political immigrants are forced to live in worst conditions, they are not permitted to work, so often they are compelled to steal for living, or they enter in conflict with local population which also is in tumult for unemployment, the rising costs of living, or economic and financial problems. In Greece they are forced to stay on the streets, there is no means for hospitality, since the population itself lacks of the necessary.

The reaction of countries globally, including EU Member States, to the worst refugee crisis since World War II has been a “shameful failure”, with the bulk of responsibility falling on a handful of countries - Amnesty International states. <http://us1.campaign-archive2.com/?u=8e3ebd297b1510becc6d6d690&id=56e325387d#UNHCR>

Pintado (2015), a representative of Spain at the European Parliament expresses fear about indifference, indifference about Christians massacred in Africa, and about the new terrorism.

These fluxes must urgently be regulated, since they have added to the phenomenon an impressive amount of people and numbers of deceases. First of all it is not more, or not only question of helping poor people, since the sea travel is largely paid by the emigrants, much more than for

a regular trip, and the gains benefit an international mafia. No one knows where the poor people money come from. It seems that 3000 or even 5000 Euros are requested by traffickers, who, nowadays, leave the ships to the migrant themselves with the only help of a GPS, to avoid to be imprisoned by the rescuers.

With thousands of Euros that African people pay to cross the Mediterranean Sea, they could be able to reach a better accommodation in a regular way. On the other part, the hosting States gain money for assistance from European Union, creating a corrupted system of hospitality, in which the benefits arrive to the organizers, not to the final subjects in need, shaping the new situation like the second face of slavery's, or, worst, a vital organs international market, like some are testifying about that.

GLOBAL INTERMIXING

After the WW2, differences among States have been increasing, instead of decreasing, both in terms of economic development, social inequality, and technological innovation. Countless political differences have been filed, but a larger hiatus has emerged in religious belief. Today the Muslim extremism is following its goal of a global war against infidels. At the same time that extremists are entering into Western States, they are criticizing the Western way of life.

As a consequence, not only wars are expanding, but great contradictions in life styles have emerged, new employment opportunities are appearing, and higher work skills are requested, sometime filled by an interexchange of immigrations and emigrations fluxes. In the XIX, and even in the XX century, migrations have been a solution for several poverty problems, but the evolutions of technological and political changes are impressive and they augment, instead of solving, poverty problems, and a new skilled immigration's forces are only accepted by certain States (Stahl, 1982).

There are no more the conditions of the gold rush in Alaska. No one can be rich in one day. Beside fluxes of migrant workers, fluxes of political refugees are menacing the peace of Europeans, who publicly strongly react to European Union policy, which try to accomplish to the Geneva Convention in accepting the so called "political prisoners"¹ even without regular request of asylum or personal documents.

1 Henry Dunant (1828–1910) was the father of the Red Cross (ICRC) whose objective has always been to ensure protection and assistance for victims of armed conflict and

The fact that boat people, without documents or official political asylum requests, are collected in international waters, saved and hosted in European countries with great benevolence, is attracting more and more people who risk their life in order to live in Europe, not only refugees.

That makes a great burden on few Mediterranean States, which, affected by the crisis, are not more able to sustain hundreds of thousands of immigrants. This is particularly true for Greece, Malta, Spain, but Italy organizes special help for ships, even in North African national waters, due to the central position of Italy along the sea routes, and their island-proximity to Africa borders. Assessing an increasing number of refugees, some States refuse to accept them, so Italy remains alone to rescue people on peril. Italy asked EU to receive help on this effort, but other member States which are, after that request, rescuing people on the Mediterranean Sea, are leaving immigrants on the Italian coasts.

Migrations fluxes are not only determined by poverty, or by the appalling detention conditions in Libia, where, when immigrants from other African States arrive, they are jailed, but by the political instability all around the Mediterranean rime, which forces many more people crossing the sea. Official reasons are connected to international terrorism and unending wars, especially in hot zones, like Middle East and North Africa. <http://us1.campaign-archive1.com/>

The UN Commission of Inquiry on human rights in Eritrea denounces the systematic and widespread human rights violations that have led to hundreds of thousands of refugees having fled Eritrea. The report documents extrajudicial executions, torture, sexual abuses and forced labor, as well as the period of unlimited military service during which Eritreans are subjected to torture, inhuman, cruel or degrading treatment. www.ecre.org.

More probably many are compelled by the search of better conditions even for trained people. In fact it is supposed that, when asylum will be obtained and security assured, many will not come back.

strife. He also organized an international congress for the "complete and final abolition of the traffic in Negroes and the slave trade". The first Nobel prize for peace's two main objectives are nowadays upset by the international terrorism. The noble soul of humanitarian organizations and individuals is nowadays powerless in facing the Islamism extremism which acts with extreme ferocity raiding throughout North Africa. It will soon be not possible to help all the besieged people or for external countries to host all the asylum seekers.

THE ASYLUM RIGHT

The last great flux of people is deriving from North Africa, towards Europe, through the Mediterranean Sea. Migrants, or the so-called asylum seekers, are accepted, according to the Geneva Convention and hosted in the first State they arrive, according to the EU Dublin Regulation, first signed in 2003, last renewed in 2013 with Dublin Regulation III. The fact is not to say "the State they arrive" but "the States where they are transported", since the States on the rim are compelled to save in international waters, even in African waters, the migrants who travel on severe unsafe difficult conditions. Do to this difficult travel's, situations with inadequate means of transport, irregular migrants focus on the nearest places, until the South Mediterranean Islands. This creates an exceptional burden on the nearest States.

A first project was planned by Italy, named *Mare Nostrum*, to save immigrants in African waters. Since the plan was very challenging, a new one, limited to international waters, was approved, named Triton. This, in a more restricted area, let hundreds of deaths to occur so "Europe's leaders have taken important steps to prevent deaths in the Mediterranean, by increasing resources for the Triton operation, and by proposing to relocate 40,000 refugees from Italy and Greece to other countries in the European Union".

Since the large quantity of immigrants from Africa by boat, in April 2015, after the case of several deaths in the sea, and the burden in few States, the Commission aimed to set up a distribution scheme "for persons in clear need of international protection, to ensure a fair and balanced participation of all Member States to this common effort", to address the overstretched reception capacity of the coastal member States.

Such a scheme will be based on member states' GDP, size of population, unemployment rate, numbers of asylum seekers and of resettled refugees already present in all member states. These are the words, or the proposals, the reality is that many Member States refuse to comply with the new rules agreed on Dublin III, redesigned in the first months of 2015, after those awful deaths of more than seven hundreds of boat people in the Mediterranean Sea in one day. These were the agreements on the EU Parliament; in fact, if migrants pass new borders, they will be deported back to the first EU country they entered, often Italy or Greece, since the proximity to the north African coasts. Malta is refusing to accept them, and usually gives help by donating gasoline to arrive until Italy; so Spain, or other countries. Migrants' surge creates tension even on Hungary-Serbia border. Hungary Prime Minister will build a 175-kilometer fence on

the border with Serbia, but even if population fears the cultivated fields invaders, some think that is a waste of money. Austria stops processing asylum requests in political move to pressurize EU Member States.<https://euobserver.com/beyond-brussels/129675>

After the rescheduled Dublin agreement, Germany, UK, Denmark, and others have offered ships for rescuing boat people, but they transport the crowds to the Italian coasts, not to process the forms of political asylum, leaving the task to Italy.

Some politicians have asked UN the permission to destroy the boats after rescuing people, but UN refused, stating that those boats are means of living for North Africans. ". <http://www.ecre.org/topics/areas-of-work/protection-in-europe/10-dublin-regulation.html>

The Dublin Agreement is establishing the State responsible for examining the application must be the first State the seekers entered. "Member States responsible for the examination of an asylum claim in Europe are on the basis of family links, or on the basis of the State through which the asylum seekers first entered, or the State responsible for their entry into the territory of the EU Member States.

http://ec.europa.eu/dgs/home-affairs/what-we-do/policies/asylum/index_en.htm "This is an important step along the way to finding answers to this crisis, but clearly much more will have to be done, including addressing root causes," UNHCR spokesperson Adrian Edwards told a press briefing in Geneva on 26th June . <http://us1.campaign>

DUTIES AND RIGHTS

The asylum right is assured by the Geneva Convention, but people have also to observe duties, like the duties of protecting themselves, but at the same time, of not abandoning the weak, the old, the children, the women, during wars, and the duty of fighting dictators or invaders of their States. All the history is painted by heroes who fought for their homeland and who have been successful. The persecuted have to learn from history how to construct democracy. Wars are always the misfortunes of Africa, but escaping is not the solution.

If we observe, we notice that new immigrants from Africa are generally men, young, healthy, vigorous. Are they without families? Surely they have left some spouses, children, certainly babies, parents, probably old and poor. Even if women and children would make the trip, they risk being exploited by traffickers, through either prostitution or child labor (Johnson, cit.).

If Europe or US have to save them, why should they save only relatively rich people and not the poorest? What the daily cost for an adult, hosted in a foreign country, a bunch of children could be helped for months. With the money spent on ships, sailors, soldiers, courts for permissions, documents and hosting facilities, hundreds of medical laboratories may be managed for indigenous population at large. It is not an humanitarian task to make such a difference among persons. www.wikigender.org. We know that if developed countries have not been able to help underdeveloped countries, it is probably the best solution for the poor to invade industrialized countries, knock on the door, but why only a bunch of population? Anyone knows that it is simpler to export or import money than men. Globalization is spreading activities in deprived areas, especially in African zones, rich on natural resources. What is lacking in deprived areas are the skills to adequate to new markets and new economy, but this lack depends on education (Organization for Economic Cooperation and Development - OECD, 2015 a). The fact is that without education it is even more difficult to participate or to take personal advantages in the global market. The brain drain in itself, could bring advantages both to individuals and States, but it is impoverishing the country of origin. "Care drain" describes the migrant women hired as care workers, who, on the other part, create a loss of care for their children left behind (Dumitru, 2014).

QUESTION OF GENDER

All that involves an ethical question and a gender question. Certainly it is stated that also women and children are among the sea travelers, but their number is incomparable low. As a woman myself, I ask to politicians: Why should old, babies and women left behind, abandoned? Why to renew the "Penelope Syndrome" (Safta et al., 2015, p. 2552) for many women who never will see their men back?

In the history of migration there are several examples of gender disparities in migration fluxes.

Care givers for homework and old people care in rich countries are generally women, but usually these are adult women, especially from East Europe, or from Philippines in Japan, for example, leaving families with children or teenagers at home. The mother's help is finalized at financing their high level studies. In any case, families are being destroyed, even in the arrival countries, where many women are stabilizing new family unions. With migration, traditional family structures and gender roles within them suffer serious changes, with important consequences on the

development of children who are forced to take risks and responsibilities beyond their age (Safta et al., 2015, p. 2550; Santric-Milicevic et al., 2015).

Usually, we recognize men among immigrants, especially young men from Africa. These are leaving territories which need someone who exploit them, these are leaving children who need both the parents, these are leaving old parents who need strong adult to help them. These are leaving places of war which need strong people able to fight dictators, these are leaving States economically destroyed by corrupters, which need more democracy that should be brought by people at large, since the corruptors must not be let free to act.

And why should territories be abandoned too, and economic activities? Europe - Russia included - has known thousands of years of wars, US a terrible civil war, Japan, China, Korea, to name the great countries, all the world has fought for gaining States of right, democracy, equity, education, human and economic development, why not Africa?

Poor countries have often as a source of investments only handwork, which is necessary, especially now, when many investments are already set for the African economic development.

OECD (2014) has in several occasions reaffirmed that one dollar or one euro invested in developed countries will be even hundred times magnified if invested in a poor country. In fact, if we calculate, a daily expenditure in western countries, corresponds to a monthly salary in the disinherited areas. Maintaining one man in an industrialized zone means to deprive dozens of children in less developed areas of their rights to go to school, to receive food and sanitary assistance (Galvani, 2009). In Western countries the economic crisis is depriving inhabitants of basic social services; the increasing cost of life is threatening the wellness of families, so inhabitants don't accept to divide the few resources with foreign people, since they have lost much, because of the crisis, and they don't want to lose more. Even if the life of the deprived ones in Europe is largely better than that of the deprived of Africa or Middle East, western people doesn't accept to be poorer for an imposed equality.

Another issue is the risk of deprivation for the new immigrants. Today, the majority of works are temporary or part time jobs, and when people come from abroad they have to stay in some places, to pay every day for house, health, drink and food, even if they are unemployed. State's public institutions are not more able to afford the increasing number of unemployed, since the unending economic crisis of 2008, which persists until today.

The last question is the delinquency. If people move to a foreign country, they don't have all the possibilities to afford all the necessities of day life, and more often there isn't other solution than dishonesty, which is considered like that by normal people, but not by people in conditions of need.

Surely the major part of Africa is suffering from instability, due to a complex interplay of demographic, ecological security and political factors, to which the post-2015 development agenda targets equitable and socially-inclusive economic growth and structural changes, focusing on empowerment, governance, social transformation, and gender equality (OECD 2014, 90).

MEN AND LANDS

The first solution will be to stop ethnic and religious-political turmoil. The second to invest in social capitals to create conditions that can accelerate economic development. The third to raise food productivity.

The title of EXPO 2015 is *Nourishing the Planet*. The first goal of the Millennium Development Goals which will end in October 2015, is "To eradicate extreme poverty and hunger".

On 16 July 2015 in Addis Ababa, during the 3rd International Conference on Financing for Development, the European Union and the UN Food and Agriculture Organization (FAO) have launched a new partnership agreement to boost food and nutrition security, sustainable agriculture and resilience in at least 35 countries.

The title of a new FAO project, presented in July 2015 in Ethiopia in the speech of its Director General "Investing in a future free from hunger" is *Achieving Zero-Hunger*.

OECD suggests that "to raise agriculture productivity can generate jobs and increase social cohesion, particularly for countries recovering from conflicts" (OECD, 2013, 90).

2015 is celebrating, among others themes, the international year of soils. We know, agriculture is a labor intensive activity and capital extensive. The major hindrance in Africa is the lack of water, but innovative systems have largely been experimented in USA, China and Israel for obtaining water or using air humidity in the best way. Chinese investors are exploiting rice cultivation in central areas of Africa, so probably is not water which is lacking, but political and organizational will.

One example of inefficiency is in Senegal, where, "Despite almost 75% of the labor force being engaged in agriculture, the sector only ac-

counts for 14% of GDP. Only 5% of the land is irrigated, but only one third of the fertile and irrigable land in the Senegal River Valley is used, even if the World Bank has provided 90 million USD in support" (OECD 2014, 84).

Adams and Page, in a study for the World Bank in 2005, on 71 developing countries migrant remittances "Do International Migration and Remittances Reduce Poverty in Developing Countries?", write that "results for the poverty headcount measure suggest that, on average, a 10% increase in the share of international migrants in a country's population will lead to a 2.1% decline in the share of people living on less than \$1.00 per person per day" (2005, 1647). We note that remittances are often used by family members at homeland for daily sustenance and not for investments. In Sicily or in other southern Italian regions - lands of vast migration in the last century - an incredible number of houses have been initiated with the remittances from abroad and not finished until today, since the immigrants came back home before gaining all the necessary money or had they decided to stay abroad for life.

In Albania the majority of the new houses, are constructed with the remittances. Due to a demonstration effect, they try to be similar, as far as possible, to castles, but the intention is often more pretentious than the results. It happens often that returned migrants have to restart their international trips in order to gain additional money. Albania is famous for number of bars, open from morning until evening, plenty of unemployed people, only men, who stay all day drinking coffee and beer, using the remittances of their women working abroad as cleaners or nurses.

In conclusion, we suppose that immigration is threatening places of immigration and, at the same time, places of emigration.

If someone is of the idea that migration is a good thing, for an ideal integration much time is requested, in some cases, much, much more than supposed. Think of the black people in USA. Have they reached an ideal integration?

The ideal integration is the equality all over the world. Little by little we must join that, but not by displacing people, better to displace ideas.

CONCLUSION

OECD with African Development Bank (ADB), United Nations Development Program (UNDP), proposes as a solution, the foreign direct investments, since they have four times augmented since 2000 and have accumulated

more than USD 200 milliards in 2014. All that needs a political and social stability, first, secondly, focused macro-economic politics, better access to public services, like education, health, food security, functioning institutions and rules.

In the 2013 Report, *Doing Business*, the World Bank, asserts that 15 of 20 countries, which have the worst performance in the world, are African.

OECD suggest that “ to raise agriculture productivity can generate jobs and increase social cohesion, particularly for countries recovering from conflicts” (OECD 2014, 90).

What has to be ameliorated is inclusion, environmental sustainability, and gender parity. In fact the post 2015-Agenda fixes, among the main goals, the gender equity, inclusion, governance, social transformation, (OECD-ADB, UNEP, 2014, 12).

ACKNOWLEDGEMENTS: I thank EUROGEO President for offering to me the possibility to attend EU Parliamentary Assembly.

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SPATIAL SEGREGATION OF ROMA POPULATION IN BULGARIAN CITIES

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ABSTRACT: Currently, there are two main trends in the study of spatial segregation: the study of spatial segregation of ethnic groups in settlements on a general level and the study of spatial structure of individual settlements – rural and urban settlements. The actual number of the Roma in Bulgaria is about 650 thousand people. After the Second World War there was a clear trend of concentration of Roma in the cities and since the beginning of the 90's of the twentieth century more than a half of the Roma population live in towns. In most cases, Roma settle down in the existing Roma neighborhoods or establish new ones, which hinders the effectiveness of the integration processes. The article analyzes the trends in the change of the number and location of the Roma communities in towns from the Liberation of Bulgaria until the beginning of the XXI century. A case study is conducted in Samokov – an analysis of the trends in demographic processes of the Roma population, the dynamics of spatial segregation, the factors influencing the establishment and growth of the Roma neighborhoods.

Key words: spatial segregation, urban settlements, Roma

INTRODUCTION

Different ethnic and religious communities live in Bulgaria and each community has its own characteristics and traditions. One of these ethnic communities consists of Roma. Bulgaria is among the countries with the highest absolute number and share of Roma population. According to the last census in 2011, in Bulgaria 325 thousand people are Roma and their share is 4.9% of the population.

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The actual number of Roma in Bulgaria is about 650 thousand people and although, according to official statistics, the number decreases, empirical research shows the opposite trend. More than half of the Roma population lives in urban areas and they are concentrated in segregated neighborhoods with complex social problems. This trend determines the need for a study whose main purpose is to analyze the trends and dynamics of spatial segregation of the Roma in towns in Bulgaria.

Spatial segregation manifests itself differently in historical periods depending on the different ideological influences. Post-socialist societies are both faced with many challenges that lead to complex structural changes, including in the cities which, according to Lefebvre (1968) are the spatial projections of society. There are new models of socio-spatial polarization based increasingly on income inequality (Weclawowitzs, 2002), and ethnicity. Duncan and Lieberson (1959) demonstrated an inverse relationship between spatial segregation and integration of ethnic groups based on their spatial location in urban areas. As a result, many scientists (Peach 1981; Massey & Denton 1993) argue that patterns of spatial segregation are indicative of processes of assimilation or integration as a whole. The concentration of people with low social status in segregated areas reduces their chances of upward social mobility.

METHODOLOGY

Spatial segregation has vital significance in the scientific studies – Weclawowicz (1998); Andersson (1998); Musterd & Ostendorf (1996); Friedrichs (1998); Huttman (1991) and other authors, and in policy discussions. For example, the report prepared by the European Commission named “Cities of Tomorrow” (2011) for the future development of European cities stressed the need to work towards “... social cohesion, balance and integration to reduce disparities between neighborhoods and achieve a low degree of spatial segregation and social marginalization”.

American and European literature on the subject of spatial segregation differ in the way they perceive segregation. This is a result of the different processes that formed their population. Those processes determine the current ethnic structure of their countries: In the United States of America, spatial patterns of segregation are traditionally analyzed and measured according to ethnicity and race. In Western and Southern Europe, researchers usually take into account the socio-economic status, the way of building-up, the quality of the houses and the level of education of the ethnic community. They point out that the main reason for the for-

mation of various types of spatial segregation in the recent decades is the large-scale immigration. Unlike them, in some countries of Central and Eastern Europe, including in Bulgaria the problems associated with spatial segregation are related to Roma.

Nowadays, two major trends are identified in the research of spatial segregation:

- Study of spatial segregation of ethnic groups is concentrated at regional level, where towns and villages are the main territorial units;
- Research on the spatial structure of the separate settlements.

Massey & Denton (1988) created one of the first conceptual schemes, which characterized spatial segregation. It includes five dimensions: evenness (the degree to which ethnic group is distributed evenly in space), exposure (the degree of isolation of a particular ethnic group against the other ethnic communities) concentration (the degree of compactness of the studied ethnic group), centralization (the degree of remoteness of the ethnic group of the city center), and clustering (the extent to which members of an ethnic group are located near each other).

At its core, spatial segregation is multidimensional spatial phenomenon of spatial concentration of a group of people with a certain class, ethnicity and/or race, which is a result of voluntary decisions (internal factors) adopted as a strategy for survival and preservation of their culture and identity or is a result of direct or indirect pressure and impact (external factors). It may be the result of direct or indirect discrimination, economic constraints, social exclusion, institutional policies and others or from a combination of these factors. Voluntary spatial segregation creates rich (i.e. Gated communities) and poor neighborhoods. In the case of voluntary segregation members of the ethnic group distance themselves from society, but not from members of their own group. Poor segregated areas are usually formed by people from the same social status and are supported by well developed internal social networks. In such areas, groups inhabiting them usually don't share the values and norms of the majority and maintain their own culture, strong sense of solidarity, easy communication and common values.

In this study, territorial changes in the number of the Roma ethnic group in Bulgaria, from the Liberation to the last census in 2011, are examined and the Roma population in the town of Samokov is given as an example for a segregated Roma neighborhood.

The information necessary for realization of the current research is provided by the following main sources:

- Statistics on the ethnic composition of the population, in particular of the Roma ethnic group – census data for the period from The Liberation till the beginning of the 21st century;
- Roma-related data, accessible in the archive funds after the year 1989 – Central State Archive – Sofia
- Other information from scientific and other studies on the Roma ethnoses in Bulgaria.
- Information from detailed social surveys in order to give a complete picture of the situation of the Roma ethnic group in Samokov.

Empirical research answers questions about:

- Specify the contemporary trends in demographic processes and socio-economic state of the Roma ethnic group in the selected cities
- Analysis of the degree of social vulnerability of families, based on a combination of several variables such as income, education, type of employment, housing conditions, public facilities, etc.
- The causes of spatial segregation: internal factors and external factors. In this regard, the satisfaction from neighborhood in which the Roma live is examined.
- To assess the role of multicultural education in the integration process and in this regard to establish the share of segregated schools in the cities. The study is done in primary and secondary schools in Samokov chosen according to their relative share of Roma pupils.

Geographic Information Systems (GIS) are used, in order to track and to make a map of territorial changes, which have occurred in Roma urban settlements and for measurement, analysis and visualization of spatial segregation, as well as to identify and characterize the patterns of spatial segregation, their structure and organization in the recent decades, based on orthophotos and urban plans. The geospatial database will be integrated with the quantitative and qualitative data obtained from the censuses, housing development data, as well as with the data obtained through surveys in the selected town.

GEOGRAPHICAL ASPECTS REGARDING THE CHANGES IN THE NUMBER OF ROMA POPULATION IN URBAN SETTLEMENTS

Population number in a given area is influenced by two factors: natural reproduction and migration processes. When the focus of the study is on ethnic communities, ethnic processes which lead to a change of ethnic identification affect their number.

In each ethnic community the different stages of demographic transition are characterized by different intensity, duration and features, depending on the specific influence of the historical, socio-economic and ethno-cultural features.

- The first phase of the demographic transition of the Roma ethnic group in Bulgaria, which was featured by moderate natural growth (up to 20‰) as a result of high birth rates (around and over 40‰) and high mortality rates (20‰), continued till the beginning of the 1950s.
- The second phase of the demographic transition of the Roma population was featured by a quick increase of the natural growth as a result of the rapid reduction of the mortality rate, combined with the relatively slow decrease in the birth rate were typical till the end of the 1990s.

Decisive influence on the birth rate decrease, respectively, the natural growth, had the final settling down of the Roma, regulated by the Council of Ministers in 1958, which coincided with the completion of the land collectivization and with a raise of the educational level of the Roma. The next significant drop in the values of the reproduction indicators was observed in the middle of the first decade of the 21st century, when accelerated rates of transition to the third phase of demographic transition were sensed. Nevertheless, the decrease of birth rates of the Roma is quite low. The level of education, the material and cultural needs, the satisfaction of certain aspirations for education and child raising, as well as children value assessment, determine the maintaining of high birth rates (26,7‰) and high natural growth (19,4‰) of the Roma at the end of the twentieth century.

The policy towards ethnic groups in the country during the studied period was characterized by too much inconsistency regarding their status. Regardless of government policy, the Roma people seemed to have found favorable conditions for life in Bulgaria, which was demonstrated by the directions of migration and by the positive migration balance by the

end of the 90s of the twentieth century. From the first decade of the 21st century – of increased emigration, as a result of the adoption of Bulgaria in the so-called Schengen “White List” (April 2001) and the EU accession of the country (January 2007) which, together with the socio-economic problems that accompany the transition period, prove to be crucial for the Bulgarian Roma in making a decision to emigrate. Increased emigration of the Roma population is confirmed by data showing what proportion of them worked abroad. Before January 1, 2002 1.5% of respondents have worked abroad; between January 1, 2002 and January 1, 2007, the share of 3.0%, but the biggest increase was after Bulgaria’s accession to the European Union (1 January 2007) - 9.9%.

Judging by the analysis of the factors for population number, it can be concluded that the natural growth has been the main factor of the growth of the Roma population in Bulgaria. Throughout the whole period after The Liberation, immigration prevails over emigration, which generally has low intensity and hence - little influence on the number of Roma in country, with only few exceptions (the years after 2001).

Two periods in the dynamics of the number of Roma can be clearly defined after the Liberation (1878): the first period corresponds with the last decade of the 20th century, and is featured by an increase in the number of Roma, due to limited Roma emigration; the second period overlaps the first decade of the 21st century, and is featured by a decrease of the number of Roma, modeled by an increasing emigration as a result of poor economic conditions and increased social insecurity in the country. Between The Liberation (1878) and the end of WWII (1944) – the Roma population number grew by 90 % – from 89 to 170 thousand people. During the second part of the discussed period – between the end of WW II and 1989, the number of Roma nearly doubled (growth of 92%) and reached 313 thousand people in 1992. During the third part of the discussed period – between 1992 and 2011, two subperiods stand out – from the beginning of the 1990s till the end of the 20th century, which period was featured by fast growth of the Roma population in the country (370 thousand people in 2001, and a second subperiod - overlapping the first decade of the 21st century - when a decrease of the Roma population was detected (2011 – 325 thousand people).

Throughout the period from the Liberation by the end of the Balkan wars (1912–1913), Roma population in the cities constitute one fifth of their total number (Fig. 1).

Until the mid 50s of the 20th century, the proportion of Roma in cities is higher than the national average and those of Bulgarian and Turkish

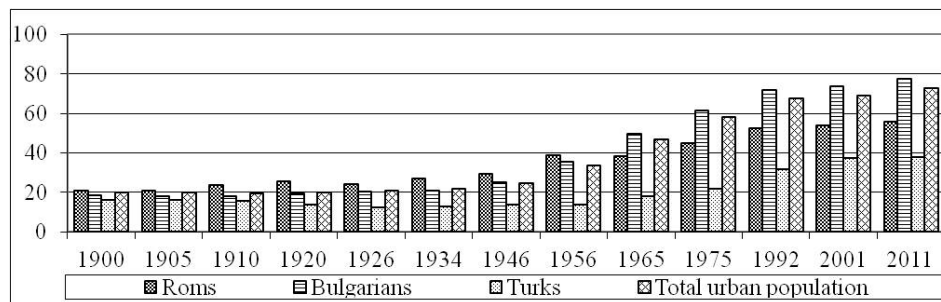


Fig. 1. Shares of the main ethnic communities in the cities (1900–2011)

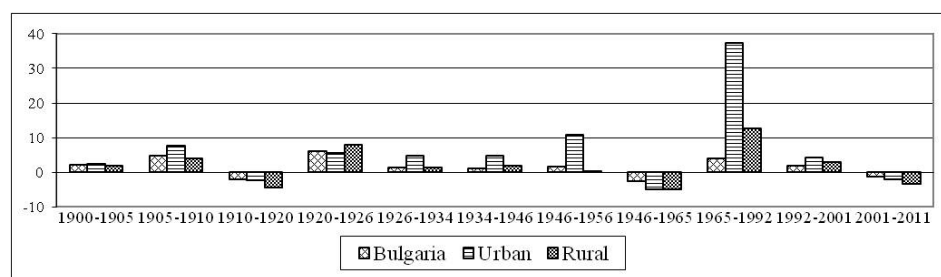


Fig. 2. Growth rate (%) of the Roma ethnic group (according to their residence) for the period 1900–2011

ethnic community. The increase of the share is mainly due to the higher growth rates of Roma in the cities (Fig. 2), which are nearly twice higher than those of the Roma in the villages, and as a result of the conversion of some villages into cities.

After 1946 there is an increase in the share of Roma in cities and in 1956 they reached 37.8% of Roma in the country. After the Second World War, there is a clear tendency of increase in the concentration of Roma in cities. They formed a little more than half of the Roma population. These trends can be explained by differences in the rates of urbanization of different ethnic communities. They are the highest among Bulgarian population, lowest among Turkish, while Roma occupy an intermediate position. The significant migration rates of young Bulgarian population from the countryside to the cities after the forced collectivization of agricultural land released part of the jobs and enabled a large number of Roma to retrain as agricultural workers and to start working in the newly established cooperatives and state farms. Some Roma people leave their villages during this period. Before that period only a small part of the Roma is constantly hired for agricultural work, primarily in the farms of wealthy

Bulgarians and Turks in Northern Bulgaria. After the industrialization in the cities, part of Roma people who were dealing with handicrafts lost their jobs as a result of changes in their lifestyle. The lower level of the education that Roma people have acquired has become a reason for them getting employed in low qualified jobs, both in cities and in villages.

Migration processes of Roma involve the whole family (unlike Bulgarians), which preserve their reproduction both in the villages and in the cities. The birth rate is higher among Roma in the cities and this determines the higher natural growth of Roma throughout the period. For example, the birth rate of the Roma population in the cities in 1946 was 51,5 ‰, and in the villages was 43,7 ‰; in 1956, respectively 41 ‰ and 37,9 ‰ and decreased in 1974 respectively 27,3 ‰ and 23,1 ‰. In contrast, for example, in 1975 the natural growth of Bulgarians in the villages are already negative (-3.25%), while in the cities its values are 11,62 ‰, which is a result of the higher birth rate in the cities and two times higher mortality rate in rural areas - the result of intensive processes of aging.

As a result of these trends, Roma population represents as a less urbanized community, compared with Bulgarian population, but significantly outpaces that of the Bulgarian Turks, (in 2011, 40% of them live in the cities). High growth rates of Roma in the cities during the period 1965–1992 were mostly due to the conversion of many villages to cities, the migratory increase and to a least extent to the natural growth, because there were no significant differences in the values of the natural reproduction indicators between urban and rural population of this ethnic group. After 1989, with higher growth rates are Roma in the cities due to an increased internal migration towards the cities, particularly due to a higher intensity of Roma emigration from the villages to the cities.

Unlike the Turkish ethnic group, the Roma people live dispersed among the general population and therefore no typical areas of high Roma settling density have been formed in the country. Each particular Roma group is economically connected to an ethnically different environment, while the contacts between the various Roma groups often are totally lacking. Therefore, the integration process within the Roma ethnic community is weak (Marushiakova & Popov, 1993, in Bulgarian). One of the reasons why Roma live across the whole territory of a given country, not just in Bulgaria, is the specific character of their professions and crafting which they practice to make a living, but yet cannot support a large group of Roma. This forces them to split into relatively small units and to maintain closer economic relations with other ethnicities rather than with their own. It is those relations that contribute to the formation

and transformation of the Roma ethnic self-consciousness, and make the estimation of the exact number of Roma difficult. Tomova (1995) assesses that approximately 30% of Roma identify themselves as part of another ethnic group.

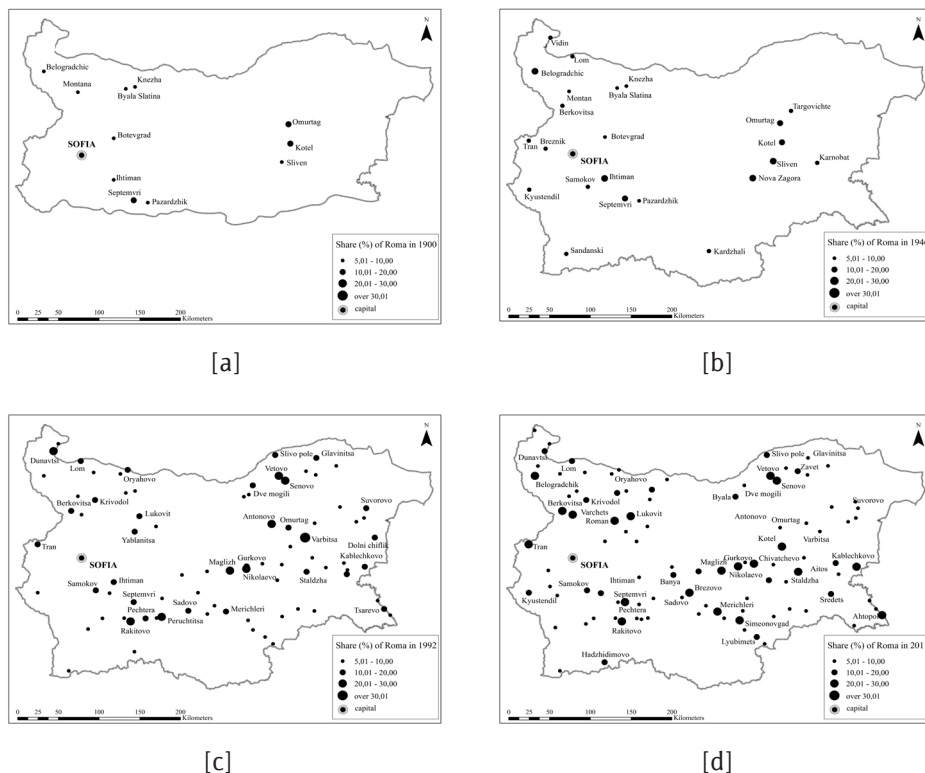


Fig. 3. Relative share (%) of Roma population in the urban settlements for the period 1900–2011: a) 1900; b) 1946; c) 1992; d) 2011

In 1900, Bulgaria has 11 cities, which have more than 5% share of Roma population and three of them have more than 10%. They are concentrated in Bulgaria's north-western region, Eastern parts of Stara Planina and along the river valley of Maritsa (Fig.3a). By the end of World War II, no significant changes occur in the relative share of the Roma population in the cities (Fig. 3b).

Since 1992, an increase of cities with high share of Roma population is observed, as it is shown in Fig. 3c and Fig. 3d they are concentrated in the Eastern parts of Stara Planina, Bulgaria's north-western region, Bulgaria's north-eastern region, and some cities along the river valley of Maritsa.

Roma population lives mainly in medium-sized (30-100 thousand residents) and large-sized (above 100 thousand residents) cities. Almost 50% of the Roma population lives in these cities, but its share in most cities is low (2-5%), with the exception of Lom (18.6%), Kyustendil (9.1%), Sliven (7,2%) and Vidin (6.3%). The share of the Roma population in small towns (from 10 to 30 thousand residents) is 29%, however their share in some towns exceeds 10% – Ihtiman, Berkovitsa, Kavarna, Lukovit, Samokov, Provadia, Aitos, Velingrad, etc. The share of the Roma population in the very small towns (less than 10 thousand residents) is 23% of the urban Roma population, but the concentration of Roma in them is the highest (above 10% share, and even above 20% in some of them).

In recent years, it is observed an increase in migration processes towards the cities, because of the severe economic crisis and the rising unemployment. This concentration is seen mainly in big cities, as nearly half of the urban Roma population is formed in cities with over 10 thousand residents.

KEY FEATURE OF SPATIAL SEGREGATION OF ROMA POPULATION IN THE TOWN OF SAMOKOV

A typical example of voluntary spatial segregation is Roma in Bulgaria and the study in-depth examines a special case – Samokov. The segregated Roma neighborhoods are perceived as models of solidarity based on ethnic relations as a strategy for survival and overcoming urban inequalities and urban poverty, thus spatial segregation is a result of both a necessity and a voluntary choice. This type of spatial segregation has well-developed social networks, which provide not only sense of security, but also preservation of culture, individual and group identity and ensure its continuity.

Samokov is a town in Sofia Province in the southwest of Bulgaria. It is situated between the mountains Rila and Vitosha, 55 kilometres from the capital Sofia.

According to the latest census of population and housing, which was held in 2011 in Bulgaria, the population of the town of Samokov is 25 348 people, 4678 of them are Roma people. More than 95% of the population in Samokov municipality professes the Christian religion. Representatives of the Roma ethnic group professing Christian religion are covered by the two Protestant churches.

More than 90% of Roma live in the old Roma neighborhood (It was founded about 100 years ago) and 9 % live in other areas of the town.

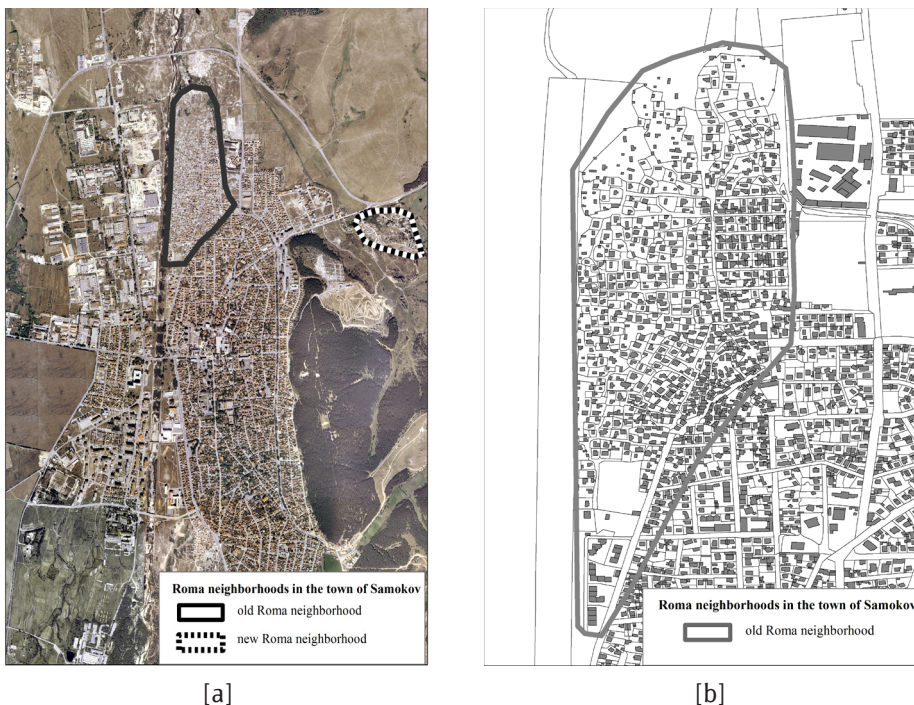


Fig. 4. Roma neighborhood in the town of Samokov: a) Orthophoto of Samokov town – old and new Roma neighborhood; b) Urban plan of the old Roma neighborhood

A new Roma neighborhood has developed in the recent years. It is still sparsely populated with marginalized and poor Roma. The neighborhood is in the periphery of the town with poor access to the center. The old Roma neighborhood, except south and east parts which are next to urbanized areas, is almost excluded from urban planning. More than 65% of its inhabitants do not have access to basic-household amenities such as a plumbing water system and sanitation facilities, as well as street pavements. Nearly 85% of Roma live in houses with the size of 30 to 60 square meters, built without observing the mandatory state building requirements and are not included in the town plan. According to data obtained from the Labour Office, the share of Roma, from the total number of people who have registered as unemployed, is about 30%.

- In 2011, the share of the Bulgarian population in Samokov is 77%, while the Roma population is about 18%.
- The changes in the share of the Bulgarians, Roma and Turks in Samokov from 1887 until 2011 is represented with the following chart

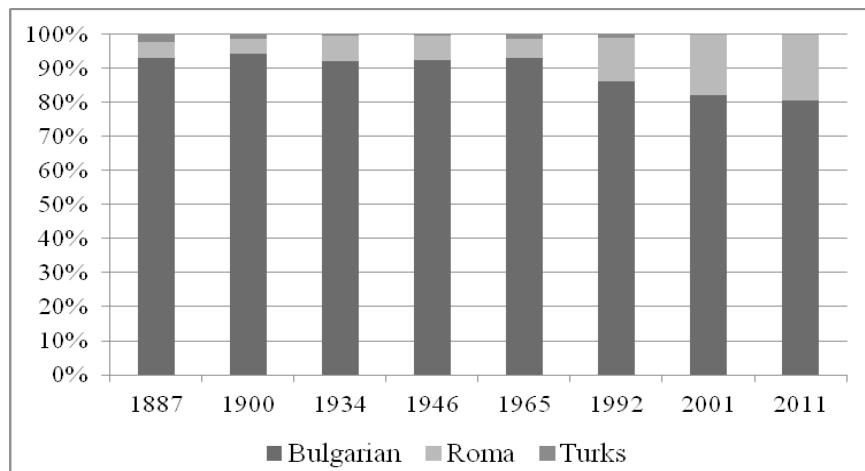


Fig. 5. Ethnic structure of the population in Samokov (1887–2011)

- The absolute number of Roma population has increased from 404 people in 1887 to 4678 people in 2011:

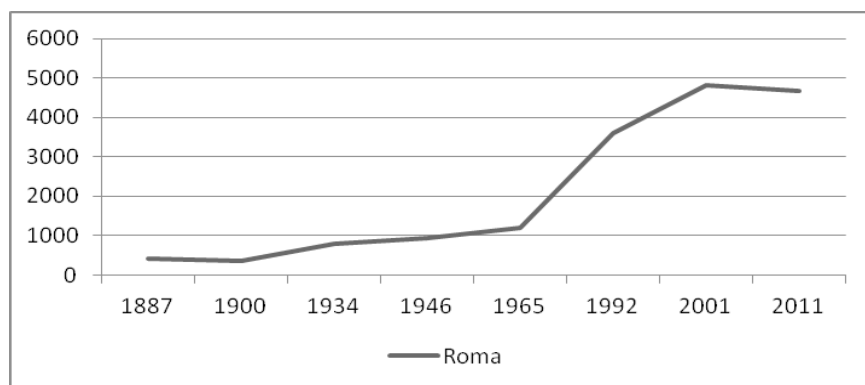


Fig. 6. Changes in the absolute number of Roma population in Samokov (1887–2011)

The study includes the data obtained from surveys in two schools (a Roma school and a Bulgarian school with classes consisting of Bulgarian pupils and several Roma pupils) in the town of Samokov. Interviews were conducted with two focus groups, each with 20 pupils. In the Roma school, the focus group included pupils aged 14–16 years old, while in the Bulgarian school pupils were aged 12–13 years old.

Questions were grouped into several categories: education, family, living conditions, satisfaction with surrounding environment in the neighborhood, ethnic relations, etc.

The results showed several different trends in both schools, which may be summarized as it follows:

- Roma from the Bulgarian school live near the Roma neighborhood or in mixed neighborhoods. They inhabit areas that in the past were populated with Bulgarians, but were occupied by Roma due to a demographic superiority. The other focus group indicated that they live in the Roma neighborhood.
- Roma pupils prefer graduating only secondary school, while Bulgarians prefer to graduate high school.
- The parents of Bulgarian pupils were well-educated (high school or at least secondary school) and employed, while the parents of Roma pupils were working as a part-time employee/unemployed and often were even without a secondary education. Many Roma in Samokov have migrated from neighboring municipalities because Samokov municipality provides temporary employment.
- Pupils answered that the most suitable age for creating a family is 20-24, some Roma pupils indicated a lower age. Almost all respondents wanted to have one or two children in the future.
- Most pupils do not accept mixed ethnic marriages.
- Roma from the Bulgarian school communicate at home and with friends in Bulgarian, while half of Roma in the other school communicate at home and with friends in gypsy language.
- Most pupils responded that they do not want to change their neighborhood, only several Roma pupils wished that they lived in another part of the town.
- Almost all pupils accept to have friendship with the other ethnicity, but are totally against mixed marriages. Many Bulgarians do not accept to work and live together with Roma people. Moreover, they think that the ethnic relations in town have declined.
- Although in the Rome school teachers told their pupils, that they are Bulgarians, most pupils consider themselves as Roma.
- Only a small part of the interviewed Roma pupils paid attention and wished that there was better infrastructure and more facilities in their neighborhood. Almost all of them answered that live in two or three-storey brick houses with water plumbing systems and sanitation facilities. Their families possess at least one car. They confirmed that their homes are equipped with satellite TV, computers, audio and video technologies and all of them possess a modern mobile phone.

Although the adopted Constitution in 1991 provides full civil and political rights for all citizens and in the years following 1989, a number of measures aimed at overcoming discrimination and respecting the rights of the ethnic groups in the country, were taken, the Roma integration is still low:

The decline of living standards in the country, the deterioration of the living conditions and the unequal status of the ethnic groups on the labor market, together with the ethnic discrimination of the unemployed, as well as the unfavorable educational structure of the Roma, additionally aggravate the differences between ethnic communities in the country and destroy the stereotypes of behavior and their relationships, sharpening the ethnic tensions.

The Action Plan of Samokov municipality in support of the integration policies of the minority groups (2012-2014) was aimed at:

- Improving the adaptability and quality of life of marginalized groups;
- Overcoming isolation in society of people from marginalized groups;
- Increasing tolerance and empathy towards Roma people;
- Better cares for upbringing, education and training of children and young people of Roma origin

CONCLUSION

This study reveals the main demographic trends, the factors which influence the spatial segregation and the forms of spatial segregation of Roma in the urban settlements and in particular in the town of Samokov.

In most cases, Roma in the cities accommodate in the existing Roma neighborhoods or form new ones. Roma neighborhoods are characterized by some common features: their population consists entirely of Roma people, sometimes they build their houses outside the land that is in regulation, most of the buildings are illegal and are chaotically located, there is a high density of building houses, there is not enough space between Roma houses, most houses are unstable ramshackle buildings without or with partially developed technical and social infrastructure, etc. The formation and growth of the Roma neighborhoods reinforce and make impossible to solve some of the most important issues related to Roma. The integration processes are very low among Roma and their children live and study in a segregated environment from an early age. Thus, all current and future actions to resolve the existing problems are doomed to failure. The prox-

imity of the ethnic groups determines the patterns of social interaction. Thus, the closeness of a large number of disadvantaged households aggravates and prolongs the shortcomings of spatial segregation.

Bulgaria has serious difficulties in terms of Roma integration, increased “ghettoisation” in the cities and the consequent risk of social upheaval in the near future.

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THE CONCEPT OF WILD CAVING

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ABSTRACT: The tourist use of wild caves is a new concept and an alternative to the old, classical show cave concept that includes extensive works and interventions in the cave development. The concept of wild caving is based on two main elements: the professional and trained guides and adequate equipment for visitors. It is necessary to select a cave according to certain geographic, morphological, hydrological and aesthetic criteria. This concept is more appropriate from the viewpoint of environment and economics. There is no damage or devastation caused by works on the cave development and during the cave use and maintenance. The concept of wild caving does not require large investments, and even in case of failure it is not considered a total financial loss. During these visits to a cave, experiencing the ambiance is quite authentic. Groups of visitors are rather small, and there is less pressure. This kind of tourism can even be practiced at the undeveloped parts of the existing show caves. The use of wild caves in Serbia is still at its beginning.

Key words: wild caving, undeveloped caves, speleology, speleological tourism, adventure tourism

INTRODUCTION

At a certain stage of development of tourism and tourist offer, as well as in the circumstances of an increased curiosity, overcoming prejudice and the development of technology, began the arranging of the caves and their including in the tourist offer. This happened in the early 19th century in Slovenia. A century and a half later the first show cave in Serbia was opened. By the end of the 20th century in Serbia 10 show caves were arranged, while there were a few hundred show caves at that time around the world (Kličković, 2010).

In the last two decades of the 20th century all negative aspects of this kind of cave use became evident in the light of growing ecological

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and environmental issues and the awakening of environmental awareness. In addition, passive forms of enjoyment and relaxation became outdated, and there appeared a rising need for innovative and more dynamic contents including an active participation, thrill and a stronger emotional experience.

THE CONCEPT OF WILD CAVING

The wild caving concept is based on the use of unarranged caves for tourism purposes. Internationally used term for this kind of activity is the “wild caving”. One might even call it the use of cave for tourism purposes or for tourist visits in the unspoiled nature. That means that the tourists or visitors are guided into unarranged caves, that is, the caves in their natural state just the way nature created them. This method affects the tourists in the way that it creates:

- a closer contact with the natural surrounding of the cave
- the sense of being active
- enhanced experience and excitement
- a unique experience that might be called an adventure

Thus, a whole series of activities, which are based on the same principles, is also called adventure tourism.

Environmental benefits of the wild caving concept

Environmental benefits of the wild caving concept are unequivocal because they lack all the negative aspects of the show caves:

- Wild caves do not have footpaths which are usually made of concrete. Therefore there are no stairs, bridges, fences, handrails. There are also no concrete works and all other works on setting up the infrastructure.
- There is no lighting, which means no electricity, lamps, distribution boxes, cables and their installation.
- There is no need for the access path.
- There is no need for setting the electrical transmission lines and substations.
- There is no need for the counter, gate, or other amenities.
- There is no need for a guard.
- There is no need for maintenance and the inevitable occasional reconstructions.

Environmental benefits are primary, though the economic ones are no less important. The use of show caves for mass tourist visits is one of the gravest forms of their devastation (Vučković et al., 2003), which is reflected in two aspects. The first aspect refers to the phase of arranging, which requires a large amount of construction works on the setting up of paths, lighting and other infrastructure. The second aspect is the very use for mass visits, when a large number of visitors in a rather short period of time, especially in the season, visit the underground space. Their presence there puts substantial pressure on the natural balance of the system.

Economic benefits of the wild caving concept

The economic benefits of the wild caving concept are derived from the environmental ones. The above mentioned (negative) elements of the show caves (Kličković, 2014a) have their cost that is not at all negligible.

Besides, there are two more very important economic benefits:

1. There is no risk of bad investment if the cave is rarely or not at all visited, which is the weakest point of the show caves.
2. Tourist activities can quickly and easily be transferred at any time into another cave in the area, or even further.

These are the investments in the use of wild caves:

1. Purchase of equipment for visitors and guides
2. Training of guides
3. Drafting of the documents (studies or surveys)
4. Organizational and technical support
5. Marketing

Without analyzing price lists, even a layman might conclude that this is far less expensive enterprise than the one of the cave arranging.

The requirements of the wild caving concept

The concept of wild caves use has its own basic requirements:

1. Selection of speleological site(s)
2. Adequate equipment for tourists – visitors
3. Small groups of visitors
4. Trained guides
5. The concept is not suitable for visitors of weak physical abilities.

THE SELECTION OF SPELEOLOGICAL SITES

Wild caving begins with the selection of a speleological site. There can be multiple criteria for the choice of cave to be used in wild caving, but the basic and most important ones are the following:

Geographical criteria (location) The cave should be relatively easily accessible. It should not necessarily be by the road, and it is even very bad to be at such a location, however, several hours of hiking to the cave is certainly unacceptable. Half an hour up to one hour walk from one means of transport to the cave would be most favourable. The return should take the same or slightly less time. Another path should be used for going back from the cave.

Morphological criteria A cave would be more appropriate than a pit, that is, a horizontal rather than a vertical site. Even a horizontal site should not contain any major cascades and vertical parts of the passage. The cave should not have impassable or inaccessible parts of passages, narrow parts, cracks, and the like. However, a few minor details that require pulling through, creeping, and the like enhance the experience of adventure. The caves with large landslides and unstable parts are not at all suitable.

Hydrographical criteria The cave should not have large streams and lakes, which are impassable or hardly passable. On the other hand, the presence of several phenomena that require treading of water, bypassing and the like, enhance the experience of adventure. Caves that are only periodically active in the hydrological sense should be avoided in the period of hydrological activity, particularly the caves with turbulent activity. Such activity is not completely predictable, and therefore the planning of tourist activity is not suitable, so these caves should utterly be avoided. These caves should only be considered as an additional content of a tourist offer.

Aesthetic criteria The cave must have a certain beauty and attractive ambience, which are reflected in the presence of speleothems and/or water flows. Otherwise, there is no experience of beauty and wild caving becomes mere adventurous stay and movement through the dark underground passage. The standard forms of speleothems, stalactites and stalagmites, have a strong visual effect when occurring in larger groups, which is more common for stalactites than to stalagmites. The stronger visual effect is produced by larger forms of speleothems, which, in addition to the authentic form, can have rich colors. These are: draperies, side poles, basins (even empty ones) and the like. The esthetic and attractive

traits of the cave are produced or reinforced by the presence of water phenomena: basins, ponds, cascades, waterfalls, streams, and even sources. The major effect is produced by a combination of speleothems and water.

Equipment for visitors

The wild cave visitors must be equipped with the appropriate minimum equipment, precisely speleological equipment. Visitors must not enter the cave unequipped, as is the case with the show caves. A visitor must possess at least a protective helmet, lamp and appropriate footwear. The headlamp has become usual and it is placed on the helmet, which makes ones hands free. The most suitable footwear is the simplest rubber boots. In addition, it is desirable that visitors have the caving or other appropriate undersuit and oversuit, one-piece or two-piece, or at least an oversuit. Anything beyond that depends on the specific requirements of visitors and the cave, as well as on the capacity of cave visit operator.

The equipment should be provided by the cave operator. Equipment has two traits. The first trait is a protective one. The helmet protects ones head from reckless hitting against the low ceiling, the lighting lights the way and eye-catching details, rubber boots allow movement on the damp ground and across shallow water, oversuit is waterproof and provides protections primarily against soiling and wetting, whereas the undersuit maintains body temperature. The second trait is the experiential one. The attractiveness of equipment enhances the overall impression.

Small groups of visitors

The nature of the visit requires small groups of visitors. Accordingly, the price of the visit should be adequate, which means that it is significantly higher than the price of a visit to a show cave.

The optimum size of the group is in the range from 5 to 10 visitors. A group of 7 visitors is ideal. The group can exclusively have less than 5 visitors. The sense of a group of less than 3 visitors is arguable. According to the usual definitions that is not actually a group. Furthermore, a group should not be larger than 15 visitors. In this case the visit lacks the attractiveness and seems more like a mass visit.

Two guides are mandatory per group. Two guides can lead a group up to 10 visitors, and only in exceptional cases, a group of up to 12 visitors. If the group has more than this number, it should be led by 3 guides, or two groups should be formed. In exceptional circumstances, the group of less than 5 visitors may be led by one guide.

Duration of the visit

Duration of the visit or stay in the cave should not be less than one hour. 2-3 hours is most suitable, which takes a significant part of the day, if we take into account the arrival and return. The visit takes even more time if it is complemented with an additional content, such as lunch, or even a tour of some natural or cultural-historical sites. Exceptionally, and depending on the specific requirements and the group profile, the stay can be longer than 3 hours.

Trained guides

Wild cave visitors must not visit the caves unguided. Visits must be led by a guide. After all, it is also the case in the show caves. In wild caves the guide is less a tourist guide, who interprets a story about the cave, and more a support to the groups. Guides must have completed certain training and they have to possess proper speleological and guiding experience.

The guides must certainly possess the aforementioned speleological equipment, just like the visitors, and even more than that.

Training of guides

Preferably, a guide with certain speleological rank and the rank of mountain guide of category III (mountain guide in summer) should have completed a certain short training of the seminar type, with the aim of connecting these two fields. The short training refers particularly to the guiding in the specific conditions of the underground environment. Ideally, the speleological rank should be of a "speleologist", preferably it should be a "junior speleologist", while a "speleologist - trainee" would be acceptable, whereby the guiding experience should be more comprehensive.

It is acceptable that "speleologist" or "junior speleologist" attend training for the mountain guide in summer conditions. Less favourable option is the mountain guide attending speleological training (training for the rank of a "speleologist - trainee").

The experience has shown that the training program, which is a combination of speleological and guiding training for people without the aforementioned ranks and experience, provides no satisfactory results.

Other

In addition to these major requirements and elements, the wild caving concept contains a number of minor organizational and operational details, but certainly no less important. These are the entity that organizes visits

(operator), the season, working hours, marketing, guiding, access to the cave, visit prices, insurance, other contents, and the like.

Prior to the starting a tourist use of a cave, it is necessary to determine the legal entity in charge of the activities performed in wild caves. After that, it is necessary to draft a study or survey on the use of wild cave for tourism purposes (wild caving study). The technical document should present in detail the above mentioned and all other details of the wild caving, with all the specifics of a determined speleological site (cave), including the entity in charge of activities.

WILD CAVING IN SHOW CAVES

There is also the possibility of wild caving in show caves. Interested visitors can be introduced into the unarranged (wild) parts of the show cave. Most of show caves in Serbia (SCS), except Resavska and Risovača, are suitable for this kind of wild caving. Resavska cave has a very few passages, which have not been included in the cave arranging, and Risovača is rather short for this purpose. Even a keen supporter of cave arranging, and the author of most cave development projects, Radenko Lazarević (2010), determined the possibility of using undeveloped parts of Bogovinska cave and some other speleological sites for this purpose. The caves arranged to a lower degree (Kličković, 2012) are more suitable for this purpose, since they contain more unarranged passages.

In show caves the organizational - technical conditions are much more favourable. The operator of tourist visits has been previously determined and, accordingly, there is a large number of tourists among which there are the potential adventurers. However, it is necessary to train guides, procure equipment and work on the details.

WILD CAVING IN SERBIA

The use of wild caves in Serbia is still at its beginning.

At the beginning of 20th century, in 2002, 2003 and 2004, there were attempts to divert local entities from the arranging of Stopića cave and to use the cave for wild caving. These attempts were not successful, and in 2009 the cave was opened for tourists. Fortunately, its use proved successful (Kličković, 2014b).

Shortly afterwards, in 2005 and 2006, there was an attempt by ASOS in cooperation with local community to use Dubočka cave (Gaura Mare) in

the village Duboka near Kučevo for wild caving. There has also been drafting the specific planning and program documentation. The promotional entries were conducted, some of which were complemented with other contents and activities, but there was nothing more to it than that.

The initiative to use Cerjanska cave in the village of Cerje for tourist visits was launched in 2009 by the Niš city municipality of Pantelej and the Directorate for construction of Niš. Cerjanska cave is located at the area of the Municipality of Pantelej, and the management is entrusted to the Directorate. Due to the efforts of the Centre of environmental thought "Prostor" the initiative became focused on the wild caving. In 2010, there was a specialized training for speleological guides in Cerjanska cave. It was the first training of its kind in Serbia, which was successfully completed by 9 participants. Documentational basis for the use (study or survey) has not been done. After that, there were sporadic (annual), mainly promotional, *wild caving entries* into Cerjanska cave, whereas a considerable attention was paid to the research activity, which provided favourable results.

The state owned company "Rezervat Uvac" has been involved in the specific and very attractive mode of wild caving since 2006. Visitors are introduced into the wild Ledena cave, which is part of Ušak cave system, until recently the largest cave system in Serbia (6180 m). The management of the Special Nature Reserve "Uvac" is entrusted to the company "Rezervat Uvac", and a cave system is located within the territory of the reserve. The entrance to the Ledena cave is located on the right bank of the Uvac river. Visitors are transported to the cave by a tourist boat on the Sjenica lake. Most departures take place at the dam "Rastoke", and others at the camp in Markove strane and a pier by the road Sjenica-Ivanjica. However, this activity has not yet been precisely determined.

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CVIJIĆ'S ETHNOPSCHOLOGY – THE CASE OF SUICIDES IN EUROPE

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ABSTRACT: The beginning of ethnopsychology development is linked with the first half of the XX century and the name of Jovan Cvijić. Studying the relief of the Balkan Peninsula and psychological characteristics of the population, he realized that they were connected. Namely, different relief and climate characteristics of some areas caused different psychological personality types. Jovan Cvijić singled out four personality types of South Slavs: the Dinaric, the Central, the Eastern Balkanic and the Pannonic. He further subdivided these types to 17 subtypes and 13 groups. Starting with this assumption, suicide rates of European countries, for the year 2012 and their relation with climate and relief are analyzed in this paper. The initial assumption was that the cold northern countries have higher rates of suicide because of the harsh climate, while southern countries have lower rates of suicide. The lowest suicide rate is recorded in southern Europe, in Greece, and it is 3,8‰, while the highest was in Lithuania 28.2 ‰. The results do not completely match Cvijić's results. The reason for this may be a lesser man dependence from nature in recent times, while at the Cvijić's lifetime the mankind was ecologically sensitive.

Key words: Jovan Cvijić, ethnopsychology, the suicide rate for 2012, GDP, Europe

INTRODUCTION

Today, when we celebrate 150th anniversary of the birth of one of the greatest Serbian geographers of all times, Jovan Cvijić, we find it hard to name a single geographical discipline which was not the subject of his study. He laid the foundations for geomorphology, and within it: glaciology, karst erosion, geology, than anthropology, ethnology etc. In the field of human geography he studied village and town habitat, types of housing, migrations, psychological types, folklore, etc. He studied both, the field of

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natural and the field of human geography as well. He lived in times without the Internet, when geography was studied directly in the field, using method of direct observation and measurement and writing in a notebook.

The results of his studies were transformed into many books, translated into many languages and used during his life and long after his death. In this paper we used results of his research of Balkan Peninsula, which were published in the book "Balkan Peninsula and the South Slavic Countries". In this and many other works, geographical determinism can be noticed, as a coupling of man and nature. Jovan Cvijić indisputably established and demonstrated the influences of nature on man's life and psychological type.

Man's dependency on nature is getting less weaker and its effect ceases to be dominant in people's lives, but it is not completely disappeared. This can be noticed in the study of suicide rates on people who live in different natural conditions. Studying ethnopsychology, science established by Jovan Cvijić, we started from the assumption that the rates of suicides in northern European countries are higher than in the southern European countries, due to drastic climate. This is the case, but the highest rates recorded in former republics of the Soviet Union. The reason for that are not harsh natural conditions or cold climate, but difficult living conditions caused by collapse of the state and economic crisis. The disintegration of society is one of the factors of instability that caused such high suicide rates, and the increasing suicide rate from year to year, further deepening the crisis.

THE TERM OF SUICIDE

Suicide is one of the most pressing problems nowadays, both in Europe and all around the world. We are witnesses of difficult times, and even 804,000 people in 2012 found solution to most problems in ending their own lives. The average annual suicide rate for the same year in Europe was 11.5 per 100,000 inhabitants. "Every 40 seconds a person commits suicide somewhere in the world and many more attempt suicide. Suicides occur in all regions of the world and throughout the lifespan" (WHO, 2014).

The term suicide originates from the Latin words: *sui* (himself) and *occidere* (kill). Suicide is usually defined as "active or passive self-destructive act in which man consciously and deliberately take away his life" (Jugović, 2011). At the mere mention of the term "suicide", man becomes nostalgic for a lost life, but there are also there are countless questions about the cause. French sociologist, Émile Durkheim has devoted great

attention to this problem. He published a book titled *Suicide*, which is the result of his research of social factors (Dirkem, 1997).

Suicide prevention do not have equal attention in all countries. Just "28 countries today are known to have national suicide prevention strategies, while World Suicide Prevention Day, organized by the International Association for Suicide Prevention, is observed worldwide on 10 September each year" (WHO, 2014). Investing in prevention means one more life saved, so it is of great importance to give this issue particular attention.

This paper analyzed the notions of suicide from a demographic point of view, and the height of the suicide rates of the European countries according to the World Health Organization for the year 2012. In addition, suicide is also the subject of psychology, psychiatry, sociology, as well as institutions such as the police, social welfare center, as well as NGOs. At world level the World Health Organization has a leading role in the study of phenomena of suicides, but also in the development of strategies for their prevention.

ETHNOPSYCHOLOGY THROUGH CVIJIĆ'S STUDY OF BALKAN PENINSULA

"Geographic environment affects not only the general course of history, disposition of various civilizations, migration, ethnic division, location and type of settlement, but also directly or indirectly affects the psychological characteristics of the population"(Cvijić, 2011).The way of life of Balkan Peninsula inhabitants, as Cvijić said, is quite different from the way of life of the people who inhabit areas with the Mediterranean climate. The study of the impact of relief, climate and other geographical factors, which affect the psychological structure of a person, falls into domain of ethnopsychology. "If we carefully examine Cvijić's opinions, in particular the study of population, migration, and overall folk life, it becomes clear that he laid foundations of ethnology, anthropology and ethnopsychology in our country" (Vasovic, 1994). Cvijić development of anthropogenic systems and the role of the environment in this development put in the context of the time, what makes it different from Ratzel human geography and from unilateral understanding of geographic determinism, and Tokarev agree with this (Gnjato, 2013).

In the book "Balkan Peninsula and the South Slavic countries", Jovan Cvijić presented results of multiyear research. In the second part of the book anthropogeographical researches are presented, with special emphasis on psychological characteristics of the South Slavs. Based on

common human characteristics, which are due to geographical factors, Cvijić singled out four personality types of South Slavs: the Dinaric, the Central, the Eastern Balkanic and the Pannonic. There are no clearly defined territorial borders among these four types, but they sometimes overlap, even mix. Each of these four types has its own varieties and the varieties are divided into groups. Dinaric type has four varieties: Šumadijski, Erski, Bosnian, Mohammedan and Adriatic; Central type has five varieties: Kosovsko-Metohijski, Western Macedonian, Moravsko-Vardarski, Šopski, Southern Macedonian; Eastern Balkanic has four varieties: Donjodunavske ploče, Srednje gore, Rumelijsko-trački, Pomački; Pannonian type has three varieties: Slavonian, Sremsko-Banatski, Slovenian or Alpine.

Cvijić best knew Dinaric type and paid more attention to it. This type occupies not only Dinara area, but also other parts of the peninsula, which are settled by migrants. Isolation due to relief and harsh climate had influence on specific personality and psychological characteristics. He points out that people from this area are "lively and subtle intelligent, and they are also gifted with varied sensibility. Lively and rich imagination are some of their characteristics, and they are also impulsive for excitement and anger. Their greatest strength wakes up when someone touches their sensibility, or sensitivity to individual and national pride. Honor, justice and freedom are extremely important for them. Living permanently in contact with the land and nature, these people have become accustomed to natural disasters, the poor harvest and animal diseases; therefore they are mentally healthier and they tolerate more easily accidents of fate" (Cvijić, 2011).

People belonging to the Central type inhabited the central part of Balkan Peninsula. Vertical relief differentiation caused ethnic and psychological diversity. As the basic psychological characteristics, Cvijić singled out "particularly realistic note of soul". He noticed one irregularity and emphasized that "Contrary to the geographical position, according to which the central type should be southerner and expansive, on the whole mental life shows something tied and cramped. Central type never knows how to completely and strongly develop their own psychological value, as it is the case with Dinaric." (Cvijić, 2011)

Eastern Balkanic type inhabited "the area east of Iskra and watershed between Iskra and Marica, therefore Donjodunavska ploča (plateau), Marica basin and Trakija and also the valley of Rodhope and Pirin, which are open to the Aegean sea". (Cvijić, 2011) Relief, compared to the previous two areas, is flatter, monotonous, but also isolated. This is why the population had been exposed to the Turkish influences, while the influence of the Renaissance did not prevail. These conditions have created a

specific psychological type which is characterized by greed, impoliteness, obscenities, but they still like work and are diligent. Cvijić noted that Bulgarians are "serious, humorless and often gloomy, but also severe and rigid and without intellectual flexibility" (Cvijić, 2011).

Pannonian type inhabited areas outside the Peninsula, the Pannonian Plain in the east and parts of the eastern Alps to the west. Wide and open plain was convenient for spreading the influence of Western and Central Europe, while the Turkish influence was very weak. Pannonian type population has its roots in the Dinaric type who settled the fertile plains. It is noted that they are not so lively as Dinara population and less entrepreneurial. The reason for this is fertile land with high yields, as well as mild relief and moderate climates.

According to Cvijić, there are 3 groups of geographic influences that play a part in migrations and the way of life of human groups: direct, indirect and geographical influences. Direct influence includes: terrain, climate and atmospheric phenomena (relative air humidity, the nature of the winds, heat and light phenomena). Each of them shape physiology and psychology of a man. "The indirect effects of environment are numerous; These are precisely all natural resources of a territory which man exploited: the richness of the land and all that it contains (coal, petroleum, ore, salt), plow fields, nutritious plants, forests, pastures, sea food, lakes and rivers and their navigability, using relief exemptions for communication, all kinds of material for construction or for fuel, etc." (Cvijić, 2011). Cvijić considered the third group of factors in combination with indirect impacts, which is, according to him, inseparable from social effects. "Geographic factor constantly affected both, directly and indirectly on human groups, their creations, way of life and work"(Cvijić, 2011).

For making punktual research results,Cvijić went one step further. Studying the influence of the environment on the way of life of people, he "made, in 1907 one kind of profile from Dalmatia to Trondheim in Norway, comparing in the same time, climate contrasts between Dalmatia and the Rügenisland" (Vasović, 1994). He studied in detail these areas, exploring the phenomena on terain. For Rügenisland, he says: "There is almost always overcast; No southern brightness. Only about noon is clearer, otherwise the whole day it's gray light, twilight. Land is as drowned in tea and a grayish fog, vaguely, there are no those sharp, clear line of the southern lands. Fresh, almost cold, but without big temperature changes. Moist air. As in the sky and atmosphere, in the man also is not so changable mood, as in southern countries; remains calmer and colder"(Cvijić, 2011).During his research trips to Norway and Denmark, Cvijić visited the National Muse-

ums, which is considered as indispensable sources of studying the culture of a nation. Looking the exhibitions of the National Museum in the prince's palace in Denmark, he noted the impact of climate and whole nature on the culture and arts. The conclusion was that "despite all the influence of the sea, land and culture, there aren't as many creative creations, and such imagination, creative freedom and taste as in warm and sunny Italy" (Cvijić, 2011).

Jovan Cvijić laid the foundations of Ethnopsychology, in detail describing 4 varieties, 17 types and 13 groups of personalities, which at the time of his research, inhabited Balkan Peninsula and northern area. As a dominant influence on the characteristic complex personality Cvijić mentioned a relief, which in addition to the latitude and longitude, affects the climate of area. Climate also has an impact on the psychological structure of personality, which can be best noticed for Dinaric type.

About Cvijić's research in the ethnopsychology field there wrote: Jovan Erdeljanović, Borivoje Drobnjaković, Vojislav Radovanović, Mitar Vlahović, Dušan Nedeljković, Milenko Filipović, Petar Vlahović and many others. "At one point Petar Vlahović warns that the Cvijić's contribution to anthropology, including ethnopsychology was not mentioned even during the celebration of the centenary of his birth" (Vasović, 1994).

Continuation of Cvijić's research can be found in the works: "Heuristic challenge ethnopsychology" by Bojan Jovanović, "Ethnopsychology in the light of contemporary concerns and knowledge of the national mentality" by Zoran Gluščević, "From ethnopsychology to ethnopsychiatry" by Dušan Kecmanović, "Ethno-psychological aspect of migration" by Vladeta Jerotić, "International misunderstandings and ethnopsychology" by Jovan Striković etc. Four-day manifestation "Cvijić's days" in Loznica 2008, starting with debate "Jovan Cvijić and ethnopsychology", where spoke Bojan Jovanović from the Balkan Institute of the Serbian Academy of Sciences and Arts.

SUICIDE RATE IN EUROPE IN 2012

Paper presents rates of suicide data, for example, number of deaths due to suicides per 100,000 inhabitants, 43 European countries in 2012, except Andorra, Liechtenstein, Monaco, San Marino and the Vatican, for which there were no data in the archives of the World Health Organization. Rates range from 3.8‰ as noted in Greece to 28.2‰ in Lithuania, which is the absolute maximum on worldwide level, too. The average value for the year 2012 was 11.5‰. Europe is characteristic for big differences, but series of regularities can be noted as well.

In 18 European countries the suicide rate is higher than the European annual average. Croatia (11.6‰) records a value which is 0.1 ‰ higher than average, and Austria value of 11.5‰, which is on the border. Regarding the state with the values of suicide rates that are lower than the European average (25), near the upper limit are Ireland (11‰) and Sweden (11.1‰).

Among the countries of northern Europe the highest suicide rate has Finland 14.8‰, and the lowest Denmark 8.8‰. In Western Europe, suicide rates range from 6.2‰ in the United Kingdom to 14.2‰ in Belgium. In central Europe, Switzerland and Germany have the lowest suicide rate of 9.2‰, while Hungary has the highest rate 19.1‰.

Southern European countries have the lowest suicide rate in year 2012. In all the Mediterranean countries of Europe, suicide rates in 2012 were lower than 6‰, and that amount also recorded in Malta, and the lowest in Greece 3.8‰.

Eastern European countries recorded the highest suicide rate. The highest suicide rate in 2012 was in Lithuania, 28.2‰. Two other Baltic states Estonia and Latvia, also have high suicide rates. In Estonia was 13.6‰ and 16.2‰ in Latvia. Besides the fact that these three countries have access to the Baltic Sea, another common feature is that all three are former Soviet Union countries. Belarus, Moldova, Russia and Ukraine also recorded high rates of suicide. At the same time, Moldova has the lowest GDP of \$2,233.8. With collapse of the Soviet Union in 1991 some changes in the life of inhabitants of these countries occurred. Factories were closed and many people lost their jobs. At the same time, in order to obtain funds for life, some people began the illegal alcohol production. Cheap and easy available alcohol quickly found its way to mentally unstable men who could not find a way to feed their families. This is the reason why man suicide rate was much higher than woman suicide rate. In 2012, the suicide rate of men was 51‰, and 8.4‰ for women.

Considering the fact that the suicide rate in the Northern European countries was low despite unfavorable weather conditions and a six-month duration of the polar night, which causes severe depression among some inhabitants, the reason for the relatively low suicide rates may be their lifestyle. The stable state and a GDP which is among the highest in Europe have influenced less stressed lives, which further causes low suicide rate. The highest GDP in Europe has Norway - \$97,363.1.

In the case of Lithuania and other former Soviet Union countries can not be determined with certainty whether the suicide was a factor of disintegration of society or disintegration of the society was the trigger for the high suicide rate. It seems that between the two there is a sort of

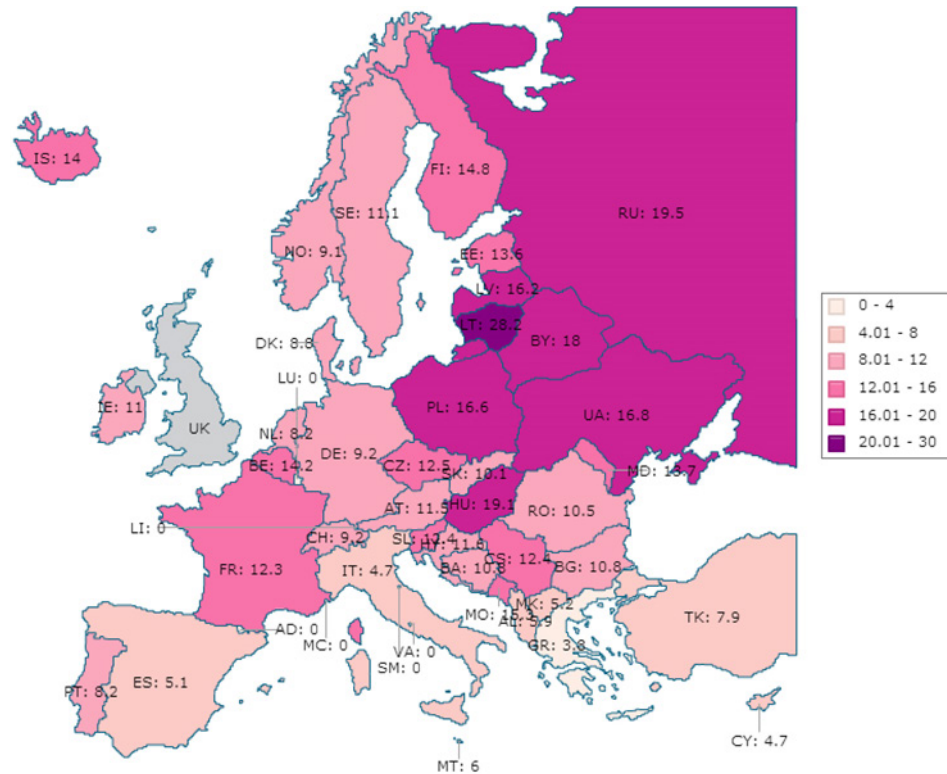


Fig. 1. Suicide rate map of European countries according to data from 2012
(Source: Made by the authors of the paper, 2015)

feedback and reciprocal relationship; poor social status certainly increases rates, and the increased number of suicides certainly deepens the crisis. However, in the Northern European countries, which are characterized by a stable socio-political system, integrated society represents the backbone for their population and suicide rates are lower.

More precise results would give a detailed analysis of the state by area divided on the basis of relief and climate. If we consider the value of GDP is the same for some state, then the effect of relief and climate on suicide rate could certainly be noticed in some parts of the state.

In Serbia, the suicide rate in 2012 was 12.4‰. In the past 50 years for Serbia is the characteristic regional disparities in the number of committed suicides in the overall population. "Vojvodina has 2-3 times higher rate than Central Serbia. In some years, the suicide rate has exceeded 30 suicides per 100,000 inhabitants (Jugović, 2011). At the same time the

lowest rates were registered in the southern parts of Serbia. According to Cvijić's ethnopsychology, Pannonian type who inhabited today in Vojvodina, tucked due to sufficient amounts of food produced in the fertile plains, has a more comfortable way of life, and less reason for stress, as opposed to the inhabitants of South Serbia, where there is heterogeneous and fractured relief. However, according to Penev and Stanović, causes of regional differences are multiple and greatly conditioned by a significantly different ethnic structure of population in Serbia. (Penev & Stanović, 2007). Indisputably, the factor of time, since the period of Cvijić's research until today, caused the appearance of new impacts on the psychological structure of personality, and even the regional differences in rates of suicide.

CONCLUSION

Suicide is one of a series of problems that affects modern mankind, and it is presented in all parts of society. The fact is that there are much more attempts and not all those with fatal outcomes, and retries not rare. Studying their causes, we invest in their prevention.

Europe is a continent with suicide rates at the bottom, but among European countries Lithuania is the first in Europe and in the world at the rate of suicide for many years. With the suicide rate of 28.2‰ in 2012, maintained the leading position. The lowest suicide rates in 2012 had a Greece 3.8‰. The suicide rate in Serbia in 2012 is little higher than European average for that year.

If we consider the suicide rates of the European countries through the prism of Cvijić's study we come across some irregularities and deviations of rates in relations to relief and climate which he singled out as the main factors of forming various psychological personality types. These deviations are expressed in Northern European countries, where the rates are low compared to colder and harsher climate. Namely, during the time of Cvijić's study GDP and stressful life didn't have so much influence as today, because the man was more connected with nature, and was more depending on it. This dependence lessened over time. However, it has not entirely disappeared, because in that case the suicide rates in the northern countries were negligibly low. Therefore, the impact of relief and climate, compared to Cvijić's time, is reduced, but shouldn't be completely ignored.

Presented results lead to conclusion that positive impact of climate is more intense than negative. Specifically, in southern Europe are lower

suicide rates, so prevails influence of warm climate compering to social and economic factors. On the other hand, in the colder parts of the continent rates are very variable, which indicates that social, economic and political factors dominate over the climate.

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INTERNAL MIGRATIONS OF POPULATION OF THE EASTERN PART OF THE REPUBLIC OF SRPSKA

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ABSTRACT: The territory of Bosnia and Herzegovina was exposed to various migrations which caused major demographic changes. The process of refugees leaving and coming back, as well as internally displaced population after 1991 throughout the Republic of Srpska has led to changes of the natural population movement and significantly changed the spatial distribution of the population in relation to earlier historical periods. The movement of refugees and displaced population in the Republic of Srpska was characterized by unequal distribution, mainly directed to the war-affected regions and ethnically homogenous regions. The study of migration in BH was aggravated by the lack of data about external migration and the fact that the census was carried out after 22 years. Moreover, the final results of the census are not yet available. The study provides a review of war migration in the area of the eastern part of the Republic of Srpska, actually in the area of Gornje Podrinje and the Town of East Sarajevo, and then it will proceed to the analysis of the basic components of the migration movements of internal migration, which directly affect the demographic picture of the eastern part of the Republic of Srpska. The paper provides a comparative analysis of migration balance of East Sarajevo and of Gornje Podrinje and it establishes how much of the space is homogeneous, whether it is migration balance positive or negative in the whole explored area, or some differences are present, and what actually caused them.

Key words: migration, East Sarajevo, Gornje Podrinje

INTRODUCTION

The study of migrations of population is a very important aspect of demographic research. Migrations of population in Bosnia and Herzegovina

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have always been present, especially in the last two-three decades. The war events from 1992 to 1995 caused huge displacement of the population both within the borders of Bosnia and Herzegovina and beyond.

The problem in the study of migrations is the lack of data, the fact that the census was carried out in 22 years and that the final results of the census are not yet published, then inappropriate migration statistics, the lack of records of external migration, etc. We can only speak about the intensity of external migration to the basic assessment, while speaking of internal migration, or the movement and displacement of the population within the borders of the Republic of Srpska, there are records since 2007 recorded by the Bureau of Statistics of the Republic of Srpska. One of the biggest problems in the study of 'brains drain' is a methodological nature and to the poor quality of migrations data by experts. The data available to us are very modest and are based on estimates and surveys, while accurate data of the number and structure of emigrants have never been available.

In the period from 1996-2001 there are about 90,000 young people who left Bosnia and Herzegovina, and also most of the young people who have fled during the war have no plans to return. Some of the main reasons why young people from these areas more often decide to emigrate are inability of to solve the two existential questions: employment and housing issues (Pašalić et al., 2006). Considering the consequences caused by the emigration of highly educated workforce from our country, one might expect a decline in quality in the field of economy, science, education. The losses would be really big and almost irrecoverable.

The following chapters of work will be analyzed by war and internal migrations in the area of the eastern part of the Republic of Srpska and through the example of two regional wholes of the area, the City of East Sarajevo¹ and Gornje Podrinje.

BASIC DEMOGRAPHIC CHARACTERISTICS OF THE RESEARCHED AREA

The City of East Sarajevo is a territorial-administrative unit which covers an area of 1,425.77 km² and stretches in the eastern part of the Republic of Srpska and in the central and eastern part of Bosnia and Herzegovina. Territory of the city is not compact, divided into the northern part (area

1 The City East Sarajevo is taken as a regional whole since it consists of 6 municipalities and city space includes not only the urban area but also the rural areas of these municipalities.

of 1,380.61 km²) and a small southern part (of 45.16 km²), which is a municipality Trnovo. The city consists of six municipalities: East New Sarajevo, East Ilidža, East Old Town, Pale, Sokolac and Trnovo. According to the census of 1991, the present-day territory of East Sarajevo was populated by 44,430 inhabitants². According to the 1991 census, the city of Sarajevo had 527,049 inhabitants, without Sokolac municipality, so the territory of present-day City of East Sarajevo has only 8.43% of the population of Sarajevo. In 2013, according to preliminary results, the City of East Sarajevo has 64,966 inhabitants, or 20,536 more residents than when it was created as city, which means that in 20 years the population of the East Sarajevo increased for 46.3%. Of the total of 216 settlements, 5 are urban communities, which are also the municipal centers where is concentrated the largest number of people. Urban settlements recorded a population increase, mainly because of mechanical influx of population, migration from villages to towns. In rural areas there is a demographic emptying and the fragmentation of the village, so it appears as a consequence of depopulation processes, deruralization, agrarian reform, rural-urban migration, and the emergence of elderly households but the extinction of a large number of rural settlements (Lukić Tanović, Golijanin & Grmuša, 2014). The City of East Sarajevo is facing with a serious problem of depopulation. Ever since 1996, with some oscillations, natural increase has a negative value in all municipalities of the city. Reducing the number of births and an increase of the number of deaths since 2000 is the result of biovitale, biodynamic and migratory movements (Lukić Tanović & Danilović, 2014).

Table 1 *Surface and the number of inhabitants in 1991 and 2013 for the City of East Sarajevo and Gornje Podrinje*

Area	Surface	Population 1991.	Population 2013.
The City of East Sarajevo*	1.426	44.430	64.966
Gornje Podrinje**	2.571	82.169	49.259
The Republic of Srpska**	24.641	1.558.387	1.326.991

Source of data: *Calculated by author based on data from the list 1991; ** Marinković, 2014.

Gornje Podrinje includes space area alongside the river Drina. It stretches in the southwest-northeast and is located in the southeastern part of BiH.

2 With regard to the problem of demarcation around the settlement the number of population in the area of East Sarajevo in 1991 is imprecise, approximate a certain number of inhabitants.

Area of Gornje Podrinje is about 2,571 km², or 5% of the total area of Bosnia and Herzegovina. Gornje Podrinje with its whole area is related to the river Drina. It comprises the area of six municipalities: Foča, Čajniče, Goražde³, Novo Goražde, Višegrad and Rudo (Ristanović, 2000). According to the census of 1991, the present-day territory of Gornje Podrinje was populated by 82,169 people. In 2013, according to preliminary results of the census it has 49,259 inhabitants or 32,910 inhabitants less, which means that for 20 years the population in the territory of Gornje Podrinje decreased by 40.1%. Municipalities of Gornje Podrinje are facing with the same demographic problems as well as municipalities of East Sarajevo, namely low birth, negative natural growth, depopulation, and aging population and so on.

If we compare the data of population and surface of researched area, it is noted that the City of East Sarajevo spreads over 5.8% of the Republic of Srpska and in 1991 there had lived 2.9% of the population of the Republic of Srpska, but this percentage increased to 4.9% in 2013 year. The opposite is on territory of Gornje Podrinje, which occupies 10.4% of the territory of the Republic of Srpska, and in 1991 there had lived 5.3% in RS, to this percentage decreased to 3.7% in 2013. That is, in the area of East Sarajevo in 1991 was 2.4% less than the population of the Republic of Srpska in relation to Gornje Podrinje but in 2013. in 1.2% of the population in relation to Gornje Podrinje (Table 1).

WAR MIGRATIONS

The territory of Bosnia and Herzegovina was exposed to various migrations and displacement of populations, which caused a large demographic change and left deep traces in urban and rural areas. The space of the former Bosnia and Herzegovina is characterized by migration and especially emigration processes. Thanks to the mechanical influx of population in urban areas, it is achieved a rapid demographic growth of urban population. It creates a greater concentration of population in cities, so the cities take a leading role in reproduction. It is estimated that in the future rural-urban migration will lose its intensity, which would allow the survival of rural areas (Pašalić et al., 2006).

The population of the Republic of Srpska in 2013, according to preliminary results of the census, is considerably lower than in 1991, which

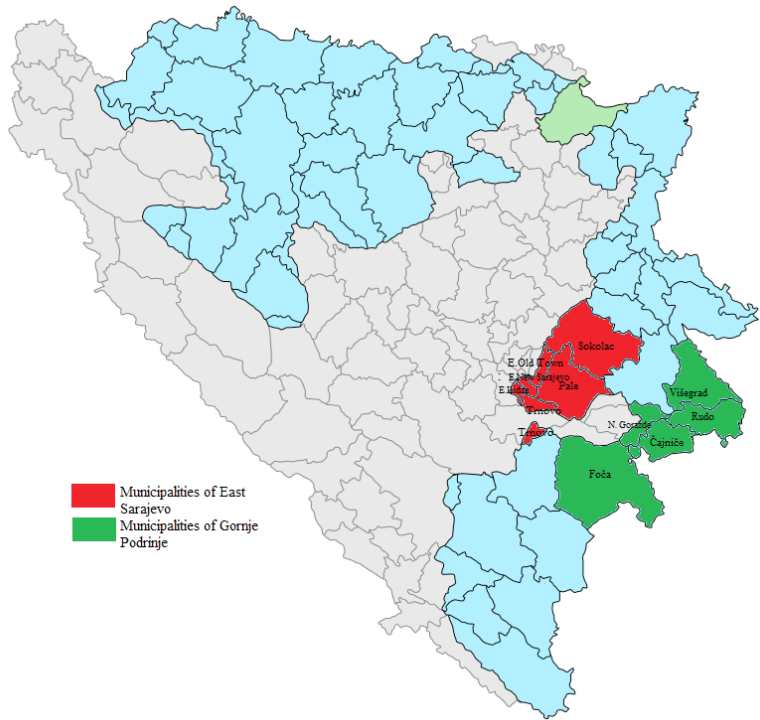
³ The Municipality of Goražde is not included in the study considering that it belongs to the Federation of Bosnia and Herzegovina.

Fig. 1. [a] Map of the Geographical position of East Sarajevo and Gornje Podrinje within Bosnia and Herzegovina; [b] Map of the position of municipalities of East Sarajevo and Gornje Podrinje within Bosnia and Herzegovina and the Republic of Srpska.



[a]

[b]



is certainly a consequence of intense displacement of the population, the process of exile, emigration abroad, war mortality and falling birth rates. The extent of the demographic changes that have occurred in this region during the war from 1992 to 1995 can only be evaluated with regard that it has been still waiting for the official results of the census of 2013 (Marinković, 2014). During the war from 1992 till 1995 the number of inhabitants further reduced, and according to estimates, after the war, in 1996 the population has decreased by 6.5% compared to the last census in 1991. Studies have shown that the total demographic losses (direct demographic losses, losses in the birth rate and migration losses) in the period from 1992 till 1995 amount to approximately 1,135,966 residents, which is 25.95% of the population in 1991, or around a quarter of pre-war population of Bosnia and Herzegovina (Lukić Tanović, Pašalić & Golijanin, 2014).

The process of refugees and the return of refugees and displaced population⁴ after 1991 throughout the Republic of Srpska have led to changes in population growth and significantly has changed the spatial distribution of the population compared to earlier historical periods (Pašalić et al., 2006).

According to the census of refugees and displaced households in 1996, the City of East Sarajevo had 21,397 households of which 11,807 were refugees and displaced households, or 55.2% (Marinković, 2005). In the region Gornje Podrinje the share of refugees and displaced households is slightly lower 38.3% and in 1996 this region had 16,373 households of which 6,272 were refugees and displaced households (Marinković, 2005). In relation to the total number of households the municipalities of Pale, East Ilidza, East Old Town, East New Sarajevo, Trnovo, Višegrad and Ča-
niče had more than 50% of refugees and displaced persons.

The regional distribution of refugees and displaced persons is a very important component of the overall demographic development of the entire area of the Republic of Srpska. The movement of refugees and displaced persons in the Republic of Srpska was characterized by unequal distribution but it was directed to the war-unaffected regions and ethnically homogenous regions. Over time, they established refugee centers in five regional areas from their gravitational centers: Banja Luka, Bijeljina, Vlasenica, Višegrad and Trebinje. The refugee center in the region of

4 Refugees (refugees persons) are all persons who, subjected to persecution because of race, religion, nationality membership of a particular social group or political opinion, find themselves outside of the borders of their state. Displaced persons are persons expelled from their homes, who found temporary housing within the borders of their country (Nejašmić, 2005).

Višegrad⁵ in 1996, had 61 689 refugees and displaced persons, or 14.6% for the full population of the region, and in 2001 45,859 persons, or 16.8% of the total population (Marinković, 2005).

Table 2. *Number of displaced persons and refugees in Eastern Sarajevo and Gornje Podrinje in 1996 and 2001.*

Area	1996.	2001.
City of East Sarajevo	35.061	24.696
Gornje Podrinje	19.795	15.857
The republic of Srpska	419.879	273.171

Source of data: Marinković, 2005.

East Sarajevo in 1996 had 35,061 refugees and internally displaced person, or 48.3% of the total population of the city, but in 2001 this percentage decreased to 32.9% (24,696 persons). In the area of Gornje Podrinje the number of refugees and displaced persons is less, and in 1996 there were 19,795 refugees and displaced persons, or 35.6% of the total population, in 2001 25.6% (15,857 persons). The researched area (both regions) in 1996 had a total of 54,836 refugees and displaced persons, or 13.1% of the total number of refugees and displaced persons in the Republic of Srpska. In 2001, the number of such persons was reduced to 40,553, but the percentage has increased the share of refugees and displaced persons in the Republic of Srpska, and in 2001 amounted to 14.8%.

Among the top ten municipalities with the highest number of refugees and displaced persons in the Republic of Srpska in 1996 was the municipality Pale (in seventh place), which had 14,221 refugees and displaced persons, or 40.6% of all refugees and displaced persons of East Sarajevo (East Ilidža 25.5% of refugees and displaced persons in the city, the other 33.9% of their remaining four municipalities).

In the area Gornje Podrinje the municipality Višegrad is separated, which in 1996 had 10,110 refugees and displaced persons, which is 51.1% of all refugees and displaced persons in the region (Foča 26.9% of refugees and displaced persons in the region, the other 22% wasted on remaining three municipalities). In 2001, although it has been reduced the number of refugees and displaced persons, in the municipalities of Pale and Višegrad is still placed the largest percentage of this population.

5 This refugee center belonged to the municipalities Višegrad, Kalinovik, Pale, Rogatica, Rudo, Foča, Novo Goražde, East New Sarajevo, East Ilidža, East Old Town, Trnovo and Čajniče (Marinković, 2005).

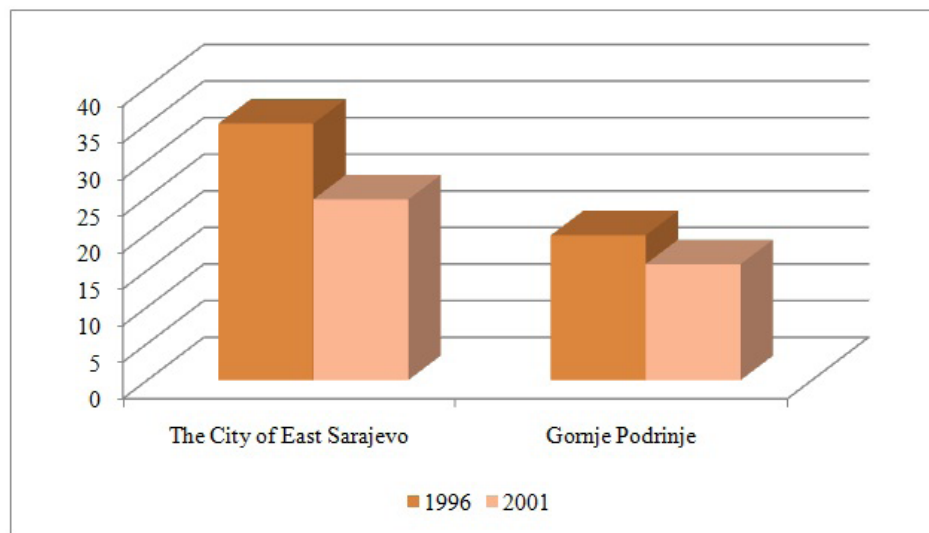


Fig. 2. Graph of displaced persons and refugees in East Sarajevo and Gornje Podrinje in 1996 and 2001.

However, if we analyze the share of refugees and displaced persons in the total population of the municipalities in the first place in 1996 was the municipality Trnovo, with 67.2% of the refugee and displaced population in the total population of the municipality, then the municipality Višegrad from 56.7%, while the municipality with the lowest share in the total population was municipality Rudo with 18.2%. In 2001 the situation was changed and the largest share of refugees and displaced persons in the total population of the municipality had the municipality Novo Goražde, 47%, and the smallest, again, municipality Rudo 14%.

The city Sarajevo is the space from which most refugees and displaced persons moved in the Republic of Srpska, or pre-war municipalities of Sarajevo (18.5%) followed by Sanski Most, Zenica, Ključ, Tuzla. Of the total number of refugees and displaced persons, in the region of Višegrad, Serbs have absolute dominance with 99% (Marinković, 2005).

At the regional distribution, the formation of refugee centers and in the course of movement of refugees and displaced persons influenced the following factors:

- Proximity of former habitual residence
- Relocation of industrial plants
- Free choice
- Free accommodation capacities.

On immigrating to the City of East Sarajevo and Gornje Podrinje the most impact had the closeness of the former place of residence, as the largest number of refugees and displaced persons in the territory of East Sarajevo moved from the city of Sarajevo. An example is the municipality East Ilidza where there are about 40% of refugees and displaced persons, which are, according to previous place of residence, from the area Ilidza, and about 30% are from the municipality New Town (Marinković, 2005).

As a specific process of migration, exile has led to major socio-economic changes and negative consequences in the Republic of Srpska. These effects are manifested in several ways, primarily through spatial consequences related to the adaptation and assimilation of refugees and displaced persons. However, the biggest effects were felt in demographic within the vital functional contingents of population. There was a decrease in the volume of reproduction and falling in birth rates, because there was less of giving the birth of children in refugee household.

The most significant demographic consequences were felt in disorders of age, gender, ethnic, educational and economic structure of the population. The consequences were felt and in socio-economic terms, actually the process of refuge is even more encouraged underdevelopment, has slowed social and economic development, increased unemployment, encouraged further emigration and disorders of the economic structure of the population. Also, refugees and displaced people, because of changed way of life, are felt psychological consequences too. Changes were cultural, historical and political consequences that are still present.

INTERNAL MIGRATIONS

In this chapter will be carried out comparative analysis of internal migration of East Sarajevo and Gornje Podrinje. Table 3 shows the number of immigrants, the number of emigrants and migration balance in East Sarajevo and Gornje Podrinje for the period since 2007, when Bureau of Statistics of the Republic of Srpska keeps records for internal migration of the population by 2013. During the period of seven years in East Sarajevo have arrived 8,936 inhabitants and have emigrated 5,938 inhabitants, while the situation in Gornje Podrinje is different, respectively, the number of immigrant population is smaller than the number of emigrants, 4,286 immigrants and 4,759 emigrant.

When analyzing the number of residents who moved to the City of East Sarajevo, it was noted that the largest number of immigrants were recorded in 2008, 1,468 inhabitants, while the largest number of emigrants

from the city were recorded in 2012, 981 inhabitants. We should also mention that the municipality East New Sarajevo in the period from 2007 to 2013 among all the municipalities of the city consistently has the highest population inflow. In 2010, 490 inhabitants moved in this municipality, which is a record number for the analyzed period for all the municipality of the city. On the other hand, the municipality East Old Town has the smallest population inflow. Municipality East Ilidža leads by residents who, in the mentioned period emigrated from this municipality, but there is no negative migration balance. In the area of Gornje Podrinje, in 2012, it was recorded the highest number of immigrants, 1,330 inhabitants, while the largest number of emigrants was recorded in 2008, 878 inhabitants. In the area of Gornje Podrinje we can extract municipality Foča, in which, in the period 2007 to 2013 was reported the highest number of immigrants 1,420 inhabitants, but in municipality Foča was recorded the highest number of emigrants in this period 1,532 inhabitants, which causes a negative migration balance.

Also, in Table 3 it can be monitored the direction of internal immigration and emigration in relation to whether emigrant population came from the Federation of Bosnia and Herzegovina, the Brčko District or from the other municipalities of the Republic of Srpska. From 2007 to 2013 most of the population migrated to East Sarajevo from other municipalities of the Republic of Srpska, then from the Federation of Bosnia and Herzegovina, while the least of immigrants migrated from the Brčko District. When talking about moving away East Sarajevo, the largest percentage of the population goes to the other municipalities of the Republic of Srpska, then to the Federation of Bosnia and Herzegovina, and at least to Brčko district.

The largest number of immigrants moved in Gornje Podrinje from the Federation of Bosnia and Herzegovina, then from the municipalities of the Republic of Srpska, and a very small number from Brčko District. And the number of migrating population is of the same direction of movement as well as the number of immigrants in the Federation of Bosnia and Herzegovina, followed by the municipalities of the Republic of Srpska and Brčko District.

In 2013, of the total immigrant population in East Sarajevo, 61% were migrants from other municipalities of the Republic of Srpska, 38.5% from the Federation of Bosnia and Herzegovina and 0.5% from the Brčko District. Among the emigrant population, they mostly have moved to other municipalities of the Republic of Srpska, 71.3% and then to Federation of Bosnia and Herzegovina 28.2% and only 0.5% to Brčko District. In the area of Gornje Podrinje, the highest immigrant population is from the Fed-

eration, 75%, then from the other municipalities in RS 27%, while from Brčko District arrived only 0.3% of the population. Number of emigrants is also the largest in the Federation of BiH -54.9% and then in other municipalities RS 44.8% and in the Brčko District 0.54% of the population.

Table 3. Number of immigrants, emigrants and migration balance of East Sarajevo and Gornje Podrinje in the period from 2007 to 2013.

Area	Year	Number of immigrants				Number of emigrants				Migration balance
		Total	From FBiH	From Brčko District	From others municipalities of the RS	Total	From FBiH	From Brčko District	From others municipalities of the RS	
City of East Sarajevo	'07	1.306	610	14	682	811	287	3	521	495
	'08	1.468	695	16	757	909	321	2	586	366
	'09	1.231	563	4	664	762	247	4	511	469
	'10	1.303	537	8	758	835	287	4	544	468
	'11	1.118	437	6	675	821	282	2	537	297
	'12	1299	529	10	760	981	281	12	688	318
	'13	1211	466	6	739	819	231	4	584	392
Gornje Podrinje	'07	444	281	4	159	664	329	9	335	-220
	'08	838	609	1	228	878	480	4	394	-40
	'09	411	263	-	148	600	326	3	271	-189
	'10	507	372	4	131	668	369	4	295	-161
	'11	300	263	5	132	564	283	4	277	-264
	'12	1330	1095	1	234	776	456	-	320	554
	'13	456	330	3	123	609	368	2	239	-153

Source of data: Demographic statistics. Statistical bulletin no:15 and no:17.

Migration balance of internal migrations of East Sarajevo in the last seven years is positive, the number of immigrant population is larger than the number of migrating population and ranged from 297 in 2011 to 495 in 2007. In 2013, migration balance was 392, as compared to the beginning of the analyzed period decreased by 20.8%. However, the opposite picture of the migration movements of the population we have in Gornje Podrinje where statistics records almost constantly negative migration balance. Just in 2012, it was recorded a positive migration balance. This picture shows us that Gornje Podrinje is one of the many migratory region of the Republic of Srpska.

In East Sarajevo, there are not all municipalities with positive migration balance of internal migration. East Old Town, Sokolac and Trnovo have a negative migration balance in 2013, while continuously positive balance has the municipalities of East Ilidža and East New Sarajevo, followed by the municipality of Pale, where the negative migration balance was recorded in 2008 and 2012. Unlike City of East Sarajevo, the municipalities of Gornje Podrinje have in general a negative migration balance and represent the typical emigration space.

It is known that the majority of migrants makes populations in the most active reproductive and productive years, between 20 and 40 years. In addition, the indirect effects of emigration of the most vital parts of the population are reflected in the loss of potential progeny of immigrants, so it realizes their fertility by receptors of countries. In doing so, the role of migration factors is essential given the rapid visible changes on the pyramid population caused by mechanical influx of population, so on inertia that is imminent to fertility (Nikitović, 2009).

Demographic analysis suggests that the Republic of Srpska after signing the Dayton Agreement has extremely emigration characteristics, especially its eastern and southwestern parts. Therefore these parts are less populated, and the population there is often changed because of constant emigration and low natural growth. Internal migrations are occurring in habitual directions, it means from underdeveloped, isolated and neglected areas in economically well-off areas with better living conditions. The causes of this migration are different, and usually are associated with better job, more money, promotion and education.

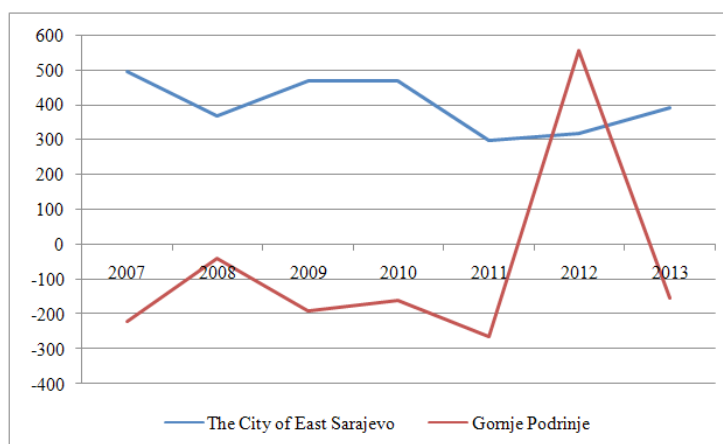


Fig. 3. Graph of Migration balance for the City of East Sarajevo and Gornje Podrinje in 2013.

CONCLUSION

Analysing war and internal migrations in the area of the eastern part of the Republic of Srpska, Gornje Podrinje and the City of East Sarajevo we have been observed a certain demographic problems that are typical for other parts of the Republic of Srpska and Bosnia and Herzegovina. The eastern part of the Republic of Srpska was affected by intensive resettlement of the population in the postwar years which is shown by the analysis of movement of refugees and displaced persons. The researched space had 54,836 inhabitants in the category of refugees and displaced persons in 1996, or 13.1% of the total number of refugees and displaced persons in the Republic of Srpska, but in 2001 this percentage was 14.8%.

After a comparative analysis of internal migration of East Sarajevo and Gornje Podrinje it was found that researched space is not homogeneous when we are talking about migration balance. The analysis found that the area of East Sarajevo is immigration area while Gornje Podrinje is extremely emigration area.

Expressed intraregional migration processes between rural and urban settlements affect the sustained reduction of rural population with the consequence of negative changes of a structural nature. The disturbances in sex-age structure and omnipresent process of aging in rural settlements and in the future will affect the reproduction of the population. Therefore, the perspective of demographic development of the Republic of Srpska largely will depend on process of redistribution of the population and on the increase of population in the municipal centers (Marinković, 2014).

The reason were the processes of resettlement of the population from rural to urban areas and settlement of municipal centers that created such a picture of migration balance in this researched area. Undoubtedly, all municipalities of East Sarajevo and Gornje Podrinje expressed the emptying of rural areas, given that the City of East Sarajevo provides much better living conditions for the population considering its increasing urbanization of municipal centers.

Pull factors or factors that attract people to the municipalities of East Sarajevo are the following: economically more developed area in relation to Gornje Podrinje, located near capital city of Bosnia and Herzegovina, better conditions for the education of the population (University of East Sarajevo), more urban areas, larger municipal centers that provide better employment opportunities and a richer cultural life. Push factors or factors that are forcing people to move from municipalities of Gornje Podrinje are the following: lack of employment opportunities of young,

poor schooling conditions, a low level of urbanization, small municipal centers do not satisfy needs of local population and so on.

Although the City of East Sarajevo is currently the most attractive place for immigrants that are from economically less developed parts of the eastern part of the Republic of Srpska, it does not mean that it will have the same trend in future. Most attention needs to focus on population policy measures that will affect the increase in birth rate but also the ones that will provide better living conditions for both, the local residents and migrants who arrive.

Migration issue is, in fact, central demographic question of municipalities of Gornje Podrinje, which continuously record a negative migration balance. Given that the majority of migrant population makes population between 20 and 40 years, this is exactly the part of the working contingent that is numerically most vulnerable, and particularly it will be that if there is no sentient recent influx of immigrants. Given that, these areas have traditionally emigration character, and in the future it should have most attention to this issue.

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TOURIST VALORIZATION OF GEOHERITAGE OF THE SERBIAN DANUBE REGION

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ABSTRACT: The aim of this paper is to present the qualitative and quantitative value assessment of geoheritage sites located in the Danube River Basin in Serbia as tourist attractions, thereby establishing their usability and market value. The following indicators have been used to carry out an evaluation of those geoheritage sites from the tourism viewpoint: site's tourism-geographic position, touristic value of the setting, destination attraction and recognisability, quality of tourist facilities and equipment of geoheritage sites, the touristic value of complementary motives of geoheritage and the importance of geoheritage for the culture and economy of a country. The geoheritage sites are evaluated based on the analysis of valorization elements as follows: grade 1 - not suitable to be a part of touristic offer, inferior in quality; grade 2 - local importance, adequate quality; grade 3 - regional importance, good quality; grade 4 - national importance, very good quality, and 5 - international importance, excellent quality. General tourist value is the average score of the analyzed valorization elements. Based on the evaluation results, it can be concluded that the geoheritage sites at hand have mainly complementary – supplementary tourist value, that they are valorized with other tourist values in the environment, contribute to the enrichment of the tourist stay contents and lead to increased tourism spending.

Key words: tourist valorization, geoheritage, Serbian Danube Region

INTRODUCTION

Geoheritage, understood as the selection of representative examples of geodiversity, has been a relatively new topic in the field of natural sciences. As regards the conservation of nature, it represents an interesting and attractive area of research for all geosciences. Foreign naturalists, geographers and geologists who travelled the country in the 19th century were

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first scientists to collect information about the geological structure of Serbia. Nevertheless, the first systematic geological research work done in the early 20th century was initiated by the founders of natural sciences in Serbia, for instance Josif Pančić, Jovan Žujović, Jovan Cvijić, Sava Urošević, Svetolik Radovanović, Petar Pavlović, Vladimir Petković, Jelenko Mihajlović and Dimitrije Antula. First efforts to protect geoheritage sites were made thereafter. In 1924, Petar Pavlović launched an initiative to protect caves in the Zlotska River canyon, which was also the first major proposal to conserve natural monuments. A preliminary list of portable geoheritage sites was compiled in 1925, while in 1927, Petar Pavlović assembled the first holotype collection consisting of 115 fossil specimens (Belij, 2008a, Jojić Glavonjić, 2010). The first Nature Protection Act in our country was passed in 1945. The terms “geodiversity” and “geoheritage” were first used in an official publication in two new acts, namely in the Environmental Protection Act (*Official Gazette*, 135/2004) and the Nature Protection Act (*Official Gazette*, 36/2009, 88/2010). Nevertheless, as regards statutory regulations and their implementation in practice, Serbia is still missing a definitive system for protecting geodiversity and geoheritage sites. The European Association for the Conservation of Geological Heritage (ProGEO) was started in the 1990s. Serbia became its member in 1995, when Serbian National Geoheritage Council was founded and when a conference on “Geoheritage of Serbia” took place in Novi Sad. That year, a definition of geoheritage was provided and as such included in the Nature Protection Act. It reads as follows, “Serbian geoheritage includes all geological, geomorphological, pedologic and special archaeological values originated throughout the formation of the lithosphere, its morphological shaping and interdependence of nature and human cultures, which have to be a special concern of all social factors in Serbia since they are part of the unique European *i.e.* world geoheritage and due to their extreme scientific and cultural significance”. The second conference on Serbian geological heritage took place in Belgrade in 2004, when an inventory of 650 Serbian geoheritage sites was published; however, the process of compiling the inventory has not been completed until this day (Belij, 2008, Belij 2009, Jojić Glavonjić, 2010; Maran Stevanović, 2014). If we consult the Serbian literature of geography, it can be seen that the subject matter of geoheritage sites that influence the development of tourism is covered only by few researchers. The most relevant papers in the field were written by Vladimir Stojanović, Dušan Mijović, Slobodan Marković, Djordjije Vasiljević, and Miroslav Vujičić. The last two proposed a model for assessing physical geosites, which could be used as a tool for planning and management of natural heritage locations and their transformation into tourism destinations. The proposed model represents a

graph consisting of nine fields into which geosites may be classified as fitting into nine general areas of suitability for tourism in terms of their main values (scientific/educational, aesthetic/scenic and protection as market appeal and conservation) and additional values (functional and tourism use as current stage of development) (Vujičić et al., 2011).

The aim of this paper is to present a qualitative and quantitative value assessment of geoheritage sites located in the Danube River Basin in Serbia as tourist motives, thereby establishing their usability and market value.

RESULTS OF GEOHERITAGE SITES EVALUATION IN SERBIAN DANUBE BASIN FROM PERSPECTIVE OF TOURISM

The Danube Basin in Serbia spans across 14,717 square kilometers, which accounts for nearly 17 percent of the country's total surface area. It comprises the following municipalities: Belgrade, Apatin, Odžaci, Sombor, Bela Crkva, Kovin, Pancevo, Novi Sad, Bačka Palanka, Beočin, Sremski Karlovci, Titel, Zrenjanin, Indjija, Irig, Stara Pazova, Kladovo, Majdanpek, Negotin, Požarevac, Veliko Gradište and Smederevo. According to the latest census information, precisely 2,826,147 people live in as many as 456 populated places, accounting for almost 39 percent of the entire Serbian population. Average population density in this area is 122 per square km (Lukić, 2015).

Out of 651 geoheritage sites listed in the territory of Serbia, 86 of them or around 13 percent are located in the Danube Basin in Serbia. Such a high percentage indicates that there are great possibilities for merging all those sites into a single sightseeing tour, which would most likely prove very successful on the tourism market. Various geoheritage phenomena could be incorporated as complementary touristic values into the existing tourism supply in this part of Serbia (Lukić & Milovanović, 2014).

According to the World Tourism Organisation, the criteria for evaluation from the perspective of tourism can be internal and external. The internal factors imply specific qualities and values of each individual tourism motive. These factors are divided into two groups: one group pertains to the utilisation level of tourism resources (urbanisation, infrastructure, equipment and tourism services), while the second group is related to their attraction attributes on which their value for tourism is based. The external factors are essentially those elements that allow for the use of a resource in tourism: accessibility, as expressed by adequate transport infrastructure (its geographic and tourism position, its location on a transport network), closeness of emission centres, *i.e.* sources of demand, specificity of the

tourism resource as compared with other resources, and its importance as determined based on the volume of tourism demand in respect of the resource concerned (Jovičić, 1997). The following factors were used when conducting the evaluation of geoheritage sites located in the Danube Basin in Serbia from the perspective of tourism: their tourism-geographic location; value of the setting from the perspective of tourism; destination attractiveness and recogniability; quality of tourist facilities and equipment of geoheritage sites; touristic value of complementary motives of geoheritage; and importance of geoheritage for the culture and economy of the country (Lukić, 2015).

The relevant geoheritage sites were assessed based on an analysis of the valorization elements from the perspective of tourism in the manner given below. The assessment results are presented in Table 1.

- Grade 1 – not suitable to be part of touristic offer, inferior in quality
- Grade 2 – important for local tourism, adequate quality
- Grade 3 – regional importance, good quality
- Grade 4 – national importance, very good quality
- Grade 5 – international importance, excellent quality (Ćirković, 2015).

The overall touristic value is represented by the average score of analysed valorization elements.

Tourism-geographic Location

The above geoheritage sites located in the Danube Basin in Serbia have been assessed for their tourist-geographic location based on the mean score they have achieved for the following indicators:

- Relation between the contractive zone of the respective geoheritage site and dispersion zones in its closer and wider environment,
- The manner in which the relevant geoheritage site is positioned with regard to roads, railway lines, navigable rivers and airports,
- The manner in which they are related to other touristic values.

During an analysis of the tourism-geographic position of a geoheritage site, one should bear in mind that if there are many similar values in one area, they are considered as each other's competitors, while the existence of a greater number of various touristic values increases the touristic value of that area (Ćirković, 2005).

It is very important to define the contractive zone of any geoheritage site because based on this factor, it is possible to plan the placement of advertising materials, forecast tourism demand and the dimensioning of accommodation facilities at places which offer touristic services. Considering that the narrowest dispersion zones belong to the biggest cities, the geoheritage sites in the Danube Basin in Serbia that are situated in the vicinity of Belgrade and Novi Sad have the greatest touristic value.

Sites located in Belgrade and its proximity are the sites with historical-geological and stratigraphic heritage such as Košutnjak, Grujina strana, Julino brdo, Straževica, Mašin majdan, Topčider, Klenje village, Kalemegdan, Rakovički creek valley, Ramadan creek, Višnjica, abandoned quarry near Barajevo, Prokop, Karagača creek valley, Vrčin, Konopljište creek valley, Veliki Crljeni and Resnik. Other sites in the same location include a cove and a lake in Sremčica, artesian well in Ovča, the right side of Danube loess bluffs, between Stari Slankamen and Zemun, affected by epirogenic movements, a paleopedologic profile of the southern variant of Kapela periglacial area near Batajnica and Stari Slankamen.

Geoheritage sites located in Novi Sad and its proximity are as follows: sites with historical-geological and stratigraphic heritage such as Čerevički creek valley and Kišnjeva glava located on Fruška gora and Petrovaradin; Mačkovo sandbar, a river island; geophytic phenomena on the southern and eastern side of Fruška gora. A wider dispersion zone is present in the Iron Gate Gorge, as well as geoheritage sites located therein and in their vicinity: sites with historical-geological and stratigraphic heritage situated in the Avramac creek and Boljetina river valleys, Pesača, Dobra, Greben, Ribnica, Lepen Hill, Jabukovac; petrological heritage sites between Dobra and Boljetin, along the Dobra – Donji Milanovac road and in the Porečka river valley, Boljetinska river canyon, Velika pećina, Renesansa, Plandište, Gradašnica, a pit in Lanište on Miroč mountain, Buranov ponor, Nemački ponor, Suvi ponor, Ibrin ponor, Rakin ponor, Veliki ponor, a tufa in the vicinity of Tumane monastery, then Deliblato, Subotica and Rama-Golubac sands, Titelski breg (loess plateau), Banat and Srem loess plateaux, Gajsko-dubovački rit peatbog, geophysical phenomena at Deliblato sands and Titelski breg, as well as along the stretch between Smederevo and Vršac, pedologic sites near Titelski breg and Šalinačko polje near Smederevo. Other sites have a very wide dispersion zone and they include sites in the vicinity of Negotin, Rudna glava near Majdanpek, a profile of Lower Maeotian with fish fossils near Iron Gate HEPP II, epirogenic movements in the valleys of Danube's right-bank tributaries in Ključ near Kladovo and Deli Jovan's fault zone with pregraben valleys (Lukić, 2015).

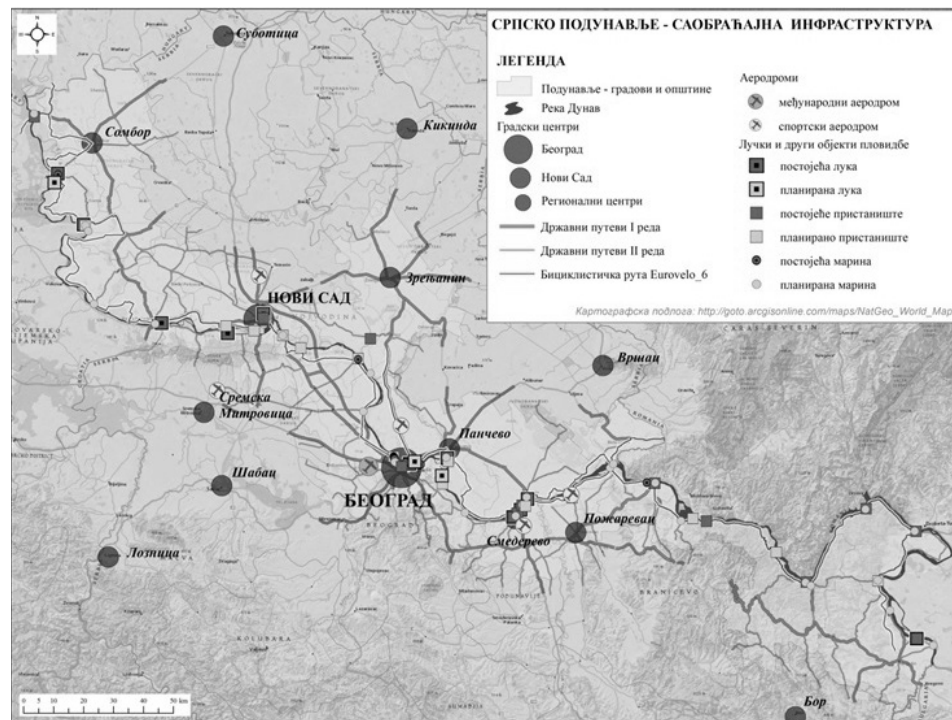


Fig. 1. Map of Transport Infrastructure in Serbian Danube Region (Lukić, 2015)

A site's transportation position depends on the quality of traffic routes and their permeability, as well as traffic levels under various weather conditions. When determining a site's tourism-geographic location, one should take into account the fact that tourists will take one route to arrive at the site and another to leave the site. Certain geoheritage sites in the Danube Basin in Serbia are located along some important transit roads. In this respect, the sites situated in Belgrade and Novi Sad as well as in their proximity have the most favourable position. They are located along the E-75 motorway and E-75 railway line, which serve as a link between the Central and Southern Europe and Southwest Asia. There is as well an airport in Belgrade. Nearby, there is route E-70, connecting Belgrade and Zagreb. The most important major roads in the Danube Basin include route M-25 (the so-called Djerdapska magistrala), a road connecting Kladovo, Negotin, Majdanpek, Kučevo, Požarevac, which branches out to Zaječar and the border with Bulgaria as well as the Belgrade – Vršac – Timisoara arterial highway. Geoheritage sites located along these routes are better positioned than those which are connected to such routes via regional, local or unsurfaced roads. All of these factors have an influence on tourist supply and demand.

Even though the Iron Gate sector of the Danube, which is an international river, is located on the periphery of Serbia and its border with Romania, this disadvantage may be offset with the development of nautical tourism (Lukić, 2015).

An analysis of the accessibility and position of the geoheritage sites in the Danube Basin in Serbia, including the values that surround them, shows that there is no site which is significant from the perspective of international tourism. This is due to the fact that no sites from the UNESCO's World Heritage List are located in their close proximity, except for *Felix Romuliana* outside of Zaječar, which is at a considerable distance from the Danube Basin. The geoheritage sites which are significant on a national scale are those in the Djerdap (Iron Gate) and Fruška gora National Park or sites located in their proximity, then sites in Belgrade or outside of the city, which together with other tourist attractions make up a complex whole along with various types of tourism. The sites that are significant on a regional scale are Deliblato sands, Subotica sands, Ram-Golubac sands, Titelski breg, Banat and Srem loess plateaux, a peatbog between the Danube and Deliblato sands, a peatbog just outside Negotin as well as Velika, Mala and Suva prerast (natural bridges) across the Vratna river, a natural bridge across the Zamna river, geophysical phenomena and historical-geological and stratigraphic heritage sites. The sites which score towards the bottom of the scale, *i.e.* the geoheritage sites which have local significance considering the values which surround them, include Rudna glava near Majdanpek, Šuplji kamen natural bridge across the Šaška River near Majdanpek, a tufa accretion called Beli izvorac, a tufa near Tumane monastery outside Golubac, landforms resulting from neotectonic activity in Ključ, on the Deli Jovan, between Stari Slankamen and Zemun, geophysical phenomena along the Smederevo – Vršac stretch, Šalinacko polje near Smederevo and pedologic phenomena near Stari Slankamen (Lukić, 2015).

Touristic Value of Setting

Touristic value of the setting is an element of the evaluation from the point of view of tourism which impacts the entire perception of geoheritage sites located in the Serbian Danube region, given the fact that it implies not only natural and anthropogenic, but also man-made tourist motives. A very important element of the evaluation is the manner in which a geoheritage site is integrated into the setting as well as how the setting is adapted to the site. In this process, the type of area, natural diversity and its preservation as well as facilities at the site and purpose of the area are assessed. The current state of preservation of nature, given the fact that it concerns geo-

heritage sites, is satisfactory, even though further steps need to be taken to ensure protection and improve the overall situation. Facilities at these geoheritage sites are virtually non-existent and there are no additional amenities which could allow this area to function as a tourist destination or facilitate some additional complex development of tourism. It would be necessary to bring together all the natural and anthropogenic motives into a combined touristic value. If they should remain as separate as they are today, they will only have the quality of a complementary touristic value. In that respect, the majority of geoheritage sites in the Danube Basin in Serbia are either not suitable to become a part of touristic offer or are of satisfactory quality. Sites that are not suitable to be presented as tourist attractions are either those that are totally inaccessible or do not even have a sign to mark them as such, lack a parking lot, a souvenir shop, an information centre, restaurants, etc. The sites whose quality is adequate include natural bridges in the Vratna river valley, which along with Vratna monastery and a parking lot in front of it can become significant as tourist spots on a local scale. The similar applies to the tufa nearby Tumane monastery outside of Golubac. More importantly, Iron Gate Gorge, with Golubac Fortress and Kladovo Medieval Fortress (Fetislam), Trajan's Tablet (*Tabula Traiana*), Diana, Lepenski Vir, Iron Gate HEPP, hotels in Golubac, Donji Milanovac, Kladovo, lookouts, parking spaces, etc. could take on significance on a national level. Stratigraphic heritage sites nearby Belgrade and Negotin, petrological heritage sites nearby Novi Sad and Fruška gora, as well as smaller sites which because of their location belong to the Iron Gate National Park, such as caves, pits, and abysses on Miroč mountain, could become significant on a regional level as well as achieve good quality with regard to this evaluation element (Lukić, 2015).

Destination Attractiveness and Recognisability

Not a single geoheritage site in the Danube Basin in Serbia, except for Iron Gate Gorge, has reached its inherent level with respect to their attractiveness and recognisability as tourist destinations. In addition, a lot more effort should have gone into positioning these entities on the tourism market and in the minds of people. Some parts of Iron Gate Gorge, including its cultural and historical heritage, are recognizable on the tourism market and frequently feature as a motive in tourism advertisements. However, the gorge itself has more of a national than international significance, even though in recent years steps have been taken to promote this region on the international market. The sites that could take on significance on a regional level based on their attractiveness include the Boljetinska Riv-

er canyon, Greben, natural bridges across the Vratna and Zamna Rivers, Suplja stena natural bridge, Beli izvorac tufa accretion and another near Tumane monastery, Carska bara, Duboka and Gradašnica caves, and lastly archaeometallurgy complex of the oldest copper exploitation in the Balkans located at Rudna glava (Lukić, 2015).

In order to improve the evaluation results from the perspective of tourism, more work needs to be put into advertising these geoheritage sites on the Internet. People working in the tourism industry have not made enough efforts to make the geoheritage sites located in the Danube Basin in Serbia more popular. Both domestic and foreign tourists could be motivated to visit these sites primarily by producing posters, leaflets, brochures or making films, using the advantages of the Internet and thus boost income from tourism (Lukić, 2015).

Tourist Facilities, Catering Establishments and Site Facilities

The fact that there are not enough tourist facilities, catering establishments or accommodation facilities is a downside of the geoheritage sites located in the Danube Basin in Serbia with regard to tourism supply. Such a state of affairs reduces the value of the analyzed geoheritage sites and reflects on the number of visitors. Tourist facilities and catering establishments are usually several kilometres away from a geoheritage site and they were built to suit the needs of some other types of tourism. Additional facilities are inferior in quality or they are non-existent. What is obvious is that there is a lack of post offices, health food shops, shops that carry products specific to individual regions, recreation grounds, benches, trails, notice boards, parking lots, and sanitary blocks. If we evaluate this element from the point of view of tourist potentials, it could be said that the sites have scored worst. Steps to be taken to improve tourism supply in these sites include, in addition to the above-mentioned, the building of facilities which would be well incorporated into the setting. In that sense, only Iron Gate Gorge is important as a tourist destination at the national level (Lukić, 2015).

Surrounding Touristic Values

Touristic values may be complex, independent and complementary. *Complex* touristic values have a number of different attractions, allow for the development of different types of tourism, have a broad contractive zone and they are easily recognized on the tourism market. *Independent* touristic values are less attractive than the complex ones and their contractive zone is not so broad, whereas *complementary* values do not produce such a high level of tourist movements (Stanković, 2014). The geoheritage sites in the

Danube Basin in Serbia belong to the group of complementary touristic values and because they are so well integrated into the greater area, they increase its touristic value and enrich the quality of the visit; the number of people who visit these sites is not that great, but tourists do visit them as areas which have tourist attractions, either independently or in organized groups. The most valuable motive from the perspective of tourism is the Iron Gate Gorge, along with Lepenski vir, Diana, Trajan's Tablet, remains of Trajan's Bridge, Golubac and Kladovo Medieval Fortresses, etc. The sites which are significant at the regional level include aeolian relief forms of sands and loess plateau, Carska bara near Zrenjanin, Mačkov sprud near Novi Sad, Rudna glava near Majdanpek and numerous geoheritage sites in the vicinity of Negotin. The significance of other sites lies in local tourism due to touristic values which surround them (Lukić, 2015).

Geoheritage Importance to Culture and Economy

Geoheritage can be a valuable natural resource; it can be used by public utilities; finally, it can be a tourist attraction. In addition to being used for the extraction of certain mineral raw materials, some ore deposits may have separate sites with preserved geoheritage sites, such as Rudna glava. Some geoheritage sites, such as hydro heritage, may also serve as strategic reserves, of drinking water in this particular instance. They can also play a part in the development of geotourism, as tourism that sustains, supports, enhances and respects the geographic character of a place being visited – its environment, culture, aesthetics, heritage and the well-being of its residents. Geoheritage may also be viewed through the prism of certain natural resources, which are limited in quantity and sensitivity and in a partially endangered state, and to top it all, they are non-renewable. Scientific value – the study of geoheritage allows us to gain knowledge about physical, chemical and biological processes that took place in the early geological history of our planet, based on which we can draw conclusions about what awaits us in the future. Cultural value – protection, enhancement and adequate promotion of geoheritage sites would enrich and round off the cultural offer of the country. Educational value – there are many geoheritage sites, either protected or not protected, that can promote cooperation between Serbian and foreign researchers, as well as student exchange in the fields of geology, geomorphology and related disciplines. Aesthetic value – geoheritage sites which possess natural beauties, which are unique and majestic, are those that also possess an aesthetic value. Recreational value – this type of value is based on the potential of such localities for becoming recreational centres (Jojić Glavonjić, 2010).

In this sense, the geoheritage sites in the Danube Basin in Serbia have achieved the best score in the evaluation process and in individual cases, they have great significance, both on the national and regional levels. Scientific, cultural and educational value is possessed by historical-geological and stratigraphic heritage sites from the Paleozoic Era, the Jurassic, Cretaceous and Neogene Periods, then petrological heritage sites and structural geoheritage sites, as well as pedologic geoheritage sites, geophysical phenomena and neotectonic landforms. Aesthetic value is dominant in the surface karst relief, speleological geoheritage sites and in fluvial and aeolian relief (Lukić, 2015).

Table 1. – *Evaluation of Geoheritage Sites of Serbian Danube Basin from the Perspective of Tourism* (Lukic, 2015).

Geoheritage sites	Tourism-geographic location	Value of setting	Destination attractiveness and recognizability	Tourist facilities and catering establishments site equipment	Surrounding touristic values	Geoheritage importance to culture and economy	General value with regard to tourism
Profile of lower Carboniferous olistromes – Avramac creek valley	3	1	1	1	2	4	2
Profile of Westphalian river sediments – Boljetinska River valley	3	1	3	1	2	4	2
Typical evolution profile in Southern Carpathians, between Permian and Jurassic periods - Pesača	3	1	1	1	2	4	2
Profile of liassic sediments with remnants of continental macroflora – Dobra	3	1	1	1	2	4	2
Profile of Klaus facies or Klaus strata with predominantly ammonite fauna – Greben (Reef) on the Danube and Boljetinska River canyon	3	1	3	1	2	4	2
Profile of Klaus strata with predominantly ammonite fauna – Ribnica	3	1	2	1	2	4	2
Stratotype profile, pelagic evolution in Southern Carpathians – Veliki greben (Great Reef)	3	1	3	1	2	4	2
Profile of Boljetin limestone formation (Jurassic period) – the place where the Boljetinska River flows into the Danube	3	1	2	1	2	4	2

Profile of pelagic evolution in the Jurassic period bordering on the Lower Cretaceous period – Lepensko brdo	3	1	3	1	2	4	2
Strata with nerinea, Barremian and Aptian ages – Košutnjak	4	1	1	1	2	4	2
Profile of shallow-water strata of Alb.-Cenom – Jabukovac	3	1	1	1	2	4	2
Marly clay strata, Lower Cretaceous period – Grujina strana (Gruja's Slope), Julino brdo (Jula's Hill)	4	1	1	1	2	4	2
Profile of Lower Cretaceous – Straževica	4	1	1	1	2	4	2
Profile of deep water formations of Lower Cretaceous period (limestone and marly) – at Veliki Greben (Great Reef) hinterland	3	1	2	1	2	4	2
Preserved Cretaceous complex from the Senonian epoch – Mašin majdan (Maša's Mine) – Topčider	4	1	1	1	2	4	2
Profile of olistoliths in Mokranje – Mokranje village	2	1	1	1	3	4	2
Profile containing fauna of sand dune organisms, Maastrichtian (Maastricht Formation)– Čerevički creek valley	4	1	1	1	2	4	2
Column, Upper Cretaceous formations – Klenje village	4	1	1	1	2	4	2
Džervin strata, Upper Cretaceous period – near Džervin Hill on the Danube	3	1	1	1	3	4	2
Profile including abundant fauna from the Middle Badenian stage – along the road outside of Donji Milanovac	3	1	1	1	2	4	2
Profile of Badenian sand dunes with characteristic fauna – Kalemegdan	4	1	1	1	2	4	2
Profile of facial heterogeneousness in the Badenian age – Rakovički Creek valley	4	1	2	1	2	4	2
“Visnjica” clay profile, with a wealth of characteristic fossils, Badenian – Ramadan creek, Višnjica	4	1	2	1	2	4	2
Profile of Khersonian transgression (Middle - Upper Sarmatian) – Bratujevački creek valley	2	1	2	1	2	4	2
Unusual succession of the Middle and Upper Sarmatian rocks – Visočko brdo	2	1	2	1	2	4	2

Profile of succession between sandy and alevrite strata (Upper Sarmatian) – Bukovska River Delta	2	1	2	1	3	4	2
Profile of large river meander (Upper Sarmatian - Maeotian) – Brza Palanka	2	1	2	1	2	4	2
Standard profile for Sarmatian development in Central Serbia – abandoned quarry near Barajevo	4	1	1	1	2	4	2
Sediment profile with gradual transition from Sarmatian to Pannonian – Prokop	4	1	1	1	2	4	2
Profile of Lower Maeotian with fish fossils in the vicinity of Iron Gate HEPP II	2	1	2	1	2	4	2
Upper Maeotian sandy sediments – Bukovo	2	1	2	1	3	4	2
Profile of Upper Pannonian stratotype, Serbiana, Europe-related – Karagača creek valley	4	1	2	1	2	5	3
Profile of typical development of Lower Pontian strata in Serbia – Konopljište creek valley	4	1	2	1	2	4	2
Profile of characteristic development of Upper Pontian strata – Veliki Crljeni	4	1	2	1	2	4	2
Jurassic limestone – Dobra–Boljetin	3	2	2	1	2	4	2
Cretaceous limestone – Dobra–Boljetin	3	2	2	1	2	4	2
Occurrence of Hercynian granite – Porečka River valley	3	1	2	1	2	4	2
Occurrence of amygdaloid spilite – along Dobra – Donji Milanovac road	3	2	2	1	2	4	2
Occurrence of Carboniferous-Permian tuffs – along Dobra – Donji Milanovac road	3	2	2	1	2	4	2
Occurrence of fresh diabase – Petrovaradin	4	1	2	1	2	3	2
Occurrence of latite – Kišnjeva glava	4	1	2	1	2	3	2
Anticline in Neocomian flysch – Resnik village	4	1	2	1	2	3	2
Cove and lake in Sremčica	4	1	2	1	2	3	2
Velika, Mala and Suva prerast (natural bridge) across the Vratna River	2	3	3	1	2	3	2
Prerast (natural bridge) across the Zamna river	2	3	3	1	2	3	2

Šuplji kamen natural bridge across the Valja river, tributary of the Šaška river	2	3	3	1	2	3	2
Beli izvorac – Tufa accretion	2	2	3	1	2	4	2
Tufa, in the vicinity of Tumane monastery	3	3	3	1	2	4	3
Iron Gate	3	4	4	4	4	5	4
Boljetinska River canyon	3	2	3	1	3	4	3
Carska bara (Imperial Pond)	2	2	3	1	3	4	3
Mačkov sprud (Mačkovo sandbar)	4	2	2	1	3	3	3
Deliblato (Banat) sands	3	2	2	1	3	3	2
Subotica (Bačka) sands	3	2	2	1	3	3	2
Rama-Golubac sands	3	2	2	1	3	3	2
Titelski breg	3	2	2	1	3	3	2
Banat loess plateau	3	2	2	1	3	3	2
Srem loess plateau	3	2	2	1	3	3	2
Gajsko-dubovački rit (Gaj-Dubovac Marsh)	3	2	2	1	2	3	2
Negotin Marsh	2	2	2	1	3	3	2
Right side of Danube loess bluffs, between Stari Slankamen and Zemun	4	1	2	1	2	4	2
Valleys of right-bank tributaries of the Danube at Ključ near Kladovo	2	1	1	1	2	4	2
Deli Jovan (mountain) fault zone with pregraben valleys	2	1	1	1	2	4	2
Timok and Sikolska Rivers, Negotin Depression	2	1	1	1	2	4	2
Notably slower propagation of seismic waves – Deliblato sands	3	1	1	1	3	4	2
Notably slower propagation of seismic waves – Titelski breg	3	1	1	1	3	4	2
Maximum intensity of Earth's gravitational field – Smederevo-Vršac stretch	3	1	1	1	3	4	2
Horizontal variations in intensity of Bouger anomaly – southern and eastern side of Fruška gora mountain	4	1	1	1	2	4	2
Profile of paleomagnetic anomalies of alverite – Ruženka	2	1	1	1	2	4	2
Velika pećina (Great cave) – Duboka	3	1	3	1	2	3	2

Renesansa – Rudna glava (archaeological site)	3	1	2	1	2	3	2
Plandište – Golubac	3	3	2	1	2	3	2
Gradašnica cave – Mosna	3	3	3	1	2	3	3
Jama u Laništu cave – Miroč mountain	3	3	2	1	2	3	2
Buranov ponor (abyss) – Golubinje	3	3	2	1	2	3	2
Nemački ponor (abyss) – Miroč mountain	3	3	2	1	2	3	2
Suvi ponor (abyss) – Miroč mountain	3	3	2	1	2	3	2
Ibrin ponor (abyss) – Miroč mountain	3	3	2	1	2	3	2
Rakin ponor (abyss) – Miroč mountain	3	3	2	1	2	3	2
Great abyss – Miroč mountain	3	3	2	1	2	3	2
Artesian well – Ovča village	4	1	1	1	2	3	2
Area with weak protection of gravel horizon – Šalinačko field	3	1	1	1	2	3	2
Paleopedologic profile of southern variant of periglacial landform – Kapela	4	1	2	1	2	4	2
Paleopedologic profile of southern variant of periglacial landform – near Titelski breg	3	1	2	1	2	4	2
Paleopedologic profile of southern variant of periglacial landform – near Stari Slankamen	4	1	2	1	2	4	2
Archaeometallurgy complex of mining technology, oldest copper exploitation in the Balkans – Rudna glava (Ore Head archaeological site)	2	1	3	1	3	5	3

Source: Geoheritage sites located in the Serbian Danube Region have been selected from the Inventory of Serbian Geoheritage Sites

CONCLUSION

Highest scores achieved with regard to the overall touristic value are related to the scientific, cultural, educational and aesthetic value of the examined geoheritage sites as well as to the touristic value of the motives that surround them. The overall touristic value of the geoheritage sites in the Danube Basin in Serbia will increase when conditions for achieving better scores with regard to other evaluation elements are made more favourable. Presently, they score at around 2, meaning that the majority of these geoheritage sites are of satisfactory quality and have significance at a local level, with the exception of Iron Gate, which has scored 4. Therefore, it is of very good quality and has significance on a national level. The tufa in

the vicinity of Tumane monastery, the Boljetina river canyon, Carska bara, Mackov sprud, Gradašnica cave, Rudna glava and the profile of Upper Pannonian stratotypes, Serbia, applicable to Europe, located in the Karagača creek valley, have scored 3 or in other words, they are of good quality and are significant for tourism on the regional level (Lukić, 2015).

In order to coordinate the development of tourism in geoheritage site with their capacities and potentials, it would be necessary for all visitors and other tourism-related persons to protect the environment, as well as to adopt proper behaviour and develop awareness of the needs of future generations for natural and tourism resources. Plans to regulate the tourist industry in these geoheritage sites should be a compromise between the promotion of tourism and the protection of the environment.

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SCIENTIFIC SIGNIFICANCE OF SYSTEM APPROACH IN CVIJIĆ'S ANTHROPOGEOGRAPHICAL STUDIES OF SETTLEMENTS

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ABSTRACT: This article gives an overview of the scientific importance of Jovan Cvijić's anthropogeographical concept of settlements research in the Balkan Peninsula. Considering the scientific modernity of his approach, very important questions have been raised: To which extent the traditional anthropogeographical concept of Jovan Cvijić is maintained in the contemporary studies of human settlements? Do the elements of the systematic approach that are presented in his anthropogeographical model still represent the important element of present-day researches in human geography? In this paper, which is both a reminder and an evaluation, the author emphasizes the significance and authenticity of traditional anthropogeographical concept and methodology, as well as the importance of system approach applied to anthropogeographical process (the process of genesis, evaluation and transformation of settlements) and its modernity measured in relation with the contemporary anthropogeographical studies of settlements. In terms of the progress of qualitative and quantitative methods of modern geography, where some of new methods are not significantly different from the traditional ones, the Cvijić's anthropogeographical concept of settlements research still has a huge scientific importance and, according to the contemporary research priorities of human geography in Serbia, needs to be given due consideration.

Key words: anthropogeography, Jovan Cvijić, settlements, methodology, systematic approach

INTRODUCTION

Jovan Cvijić (1865–1927) is the founder of the prominent anthropogeographical school in Serbia, which experienced its golden age at the time

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of his scientific engagement. In the extremely diverse and complex Cvijić's scientific opus, it is difficult to single out one dominant area of anthropogeography. His scientific achievement is reflected in the setting up of theoretical and methodological basis for many scientific disciplines (Population geography, Geography of settlements, Political geography, Economic geography), which is the starting point and incentive for contemporary researches. His contribution in anthropogeographical researches of settlements is undeniable. Theoretical and methodological basis of Cvijić's studies of settlements and their scientific relevance and applicability in contemporary anthropogeography is understandable in light of the fact that the aim of the researches of settlements was "that all sides of anthropogeographical problem are enlighten in such a way - that their causes can be seen, various and complicated causes, as with all problems concerning that interesting link and reciprocal influences between the whole of nature and ethnic moments, then human creations and human migration" (Cvijić, 1991a). Leaving aside the analysis of complex methodological principles of Cvijić's anthropogeographical concept in the studies of settlements, this paper emphasizes its authenticity which is reflected in the application of a system approach. In Cvijić's research and methodological procedure the *application of the system approach on anthropogeographical process of settlements development* (the process of genesis, evolution and transformation of settlements) can argumentatively be determined, which is also an important methodological point of modern Geography of settlements.

System Approach in the Methodology of Traditional Anthropogeography in Serbia

Theoretical and methodological basis of the anthropogeography according to the concept of Jovan Cvijić is shown in his work "*Antropogeografski problemi Balkanskog poluostrva*" ("*Anthropogeographical Problems of the Balkan Peninsula*", 1902). The following methodological principles are exposed: 1) the problems are researched; material is collected for those problems; the material about which it is not known what it is for is not collected; 2) the aim of the research is to cast light on anthropogeographical problems in such a way that the diverse and complex causes can be seen, as with all problems connected to relationships and mutual influences between the whole of nature and ethnic elements, human creations and human migrations; 3) description in the anthropogeographical works must be overcome and the phenomena from national life fully explained; 4) explanations and conclusions must be based on the existing factography; and 5) anthropo-

geographic and ethnographic phenomena must be related to the material (economic) basis (Carić, 1982).

Cvijić's anthropogeographical concept was developed in accordance with his methods of work in the field. In this way, the importance of applying the method of direct observation in the field is explicitly outlined. Extensive field researches created the basis of subsequent *system processing of typologically original anthropogeographical material*, which gave anthropogeographic research on the Balkan Peninsula the authenticity that has been preserved until today (Martinović, 2009).

Methodological plan of field researches (Cvijić, 1991a) is set in "*Uputstva za proučavanje sela*" ("*The Guidelines for the Study of Villages*", 1896). In accordance with anthropogeographic specifics, the three more special guidelines were made until 1898 (for Serbia; Old Serbia and Macedonia; and Bosnia and Herzegovina), as well as "*The Guidelines for the Study of Settlements and Psychological Features*" (1911) and "*The Guidelines for the Study of the Origins of the Population and Psychological Features*" (1922). The above Guidelines were the result of extensive field researches that got their final appearance in his monumental work "*Balkansko poluostrvo*" ("*The Balkan Peninsula*").

In his first Guidelines Cvijić grouped the questions into seven thematic sections: 1) The location of the villages; 2) Type of villages; 3) The house, yard and garden; 4) Second home settlements and other buildings with specific functions in connection with their agricultural orientation, situated in the mountain regions and valleys; 5) The stories and interpretations of the names of the villages; 6) The establishment of the villages, previous settlements and their traces; and 7) Occupation of the population. The Guidelines provided the basis for the typological classification of the settlements. In that way, it was possible to apply *system-structural approach* in the typological classification of settlements according to various criteria - types of positions, physiognomic, genetic and functional characteristics. The aforementioned typological classifications of settlements established relatively homogeneous structured *settlement systems (and subsystems)* with prominent hierarchical organisation.

The results of field researches of Cvijić's associates and followers based on the Guidelines are contained in anthropogeographic works in a scientific edition "*Naselja srpskih zemalja*" ("*Settlements of the Serbian Territory*") that Cvijić launched in the Academy of Sciences in 1902 (in 1922 edition changed its name to "*Settlements and Origins of Population*"). These works have provided invaluable importance in the study of anthropogeographical problems in Serbia and Balkan Peninsula. This confirmed

Cvijić's words that this edition "will be the most beautiful and the most lasting monument we are leaving behind, which only our distant generations will know how to appreciate it worthily" (Erdeljanović, 1927).

The complex methodological principle of traditional Serbian anthropogeographic school is reflected in the implementation of a wide range of scientific methods (method of direct observation in the field, genetic, sociological, geographic-comparative, typological method, method of ethno-psychological profiles, etc.). In this paper we will emphasize only the *implementation of system approach* in Cvijić's anthropogeography, which is also an important methodological point of modern human geography.

Explicitness of system approach in anthropogeographic concept of J. Cvijić is contained in four main stipulations: 1) the integrity of research facilities; 2) its complex structure and hierarchical organisation; 3) the connections between the elements and phenomena; and 4) the existence and interrelations of a numerous factors (Radovanović, 1982). By implementation of system approach it was possible to "reveal the phenomena and characteristics of the entire specific geography of people and settlements, migrations and ethnic processes, social organisation, economic aspects, material and spiritual culture, mentality, and all of it link to the geographical environment, political-historical and cultural-historical process" (Radovanović, 2003).

Among the many authors who have given the opinion that one of the most important innovation in Cvijić's methodical concept is the implementation of system approach in anthropogeographical process, M. Radovanović (1982), S. Stamenković (2001) and M. Grčić (2004) should be emphasized. The application of system principle in the genesis, evolution and transformation of anthropogeographic system enabled to connect into one whole all spheres of anthropogeography - geodemographic, geocultural, geoeconomic, geocological, geologicistic, geopolitical and geostrategic. In this way, the "classic paradigm of Cvijić's anthropogeographic school is quite close to "modern" paradigm, and a system principle in anthropogeography today gives new meaning to the complex anthropogeographic synthesis (Grčić, 2004). The core of the scientific system of anthropogeography is still an integrative systematic unity which, from the standpoint of system principle applied to anthropogeographic complex, can be seen as "a system in which every significant change of the components (subsystems) demands changes in the structure of the entire system, succumbing to functional (deterministic) and stochastic (statistical) laws of behavior and development of any real system in space and time" (Radovanović, 2003).

*Anthropogeographic Problems of Settlements in the Works
of Jovan Cvijić - Elements of the System Approach*

For anthropogeographic knowledge of the settlements of the Balkan Peninsula Cvijić gave the works of capital importance. His observations and remarks presented in 1902 in "*Antropogeografski problemi Balkanskog poluostrva*" ("*Anthropogeographic Problems of the Balkan Peninsula*") set the basis for future detailed studies of the settlements of Serbian and South Slavic peoples (Čulibrk, 1969). Cvijić's anthropogeographic method in the researches of settlements was adjusted to the environment. Because of that, the results of detailed studies that he organized were very extensive and new for that time. In this way, Cvijić opened a new era in the study of settlements of the Balkan Peninsula, paying attention to all nations and cultural zones of the studied area (Daneš, 1927).

The basic methodological principle of scientific work according to Cvijić is the application of *genetic method*, which most adequately interprets the genesis and development of settlements in the historical-genetic frameworks and links their geographical and historical aspect (Radovanović, 1959). In anthropogeographical research of settlements he also applied physical-geographical, sociological method and, above all, the methods of the social sciences - the method of direct observation in the field, geographical-comparative, cartographic, statistical method and methods of systematization, classification and typology (Grčić, 2004). An emphasis should especially be put on the *method of typology*, applied in studies of rural and urban settlements, thus enabling generalization of empirical data about settlements using *system approach*. In this way, relatively homogeneous *systems and subsystems of the settlements* are singled out according to different criteria.

Jovan Cvijić defined the settlement as "a place where settlement is located along with cultivated and economically used soil around it" (Cvijić, 1969). He also classified settlements into two main groups – *varoš (towns)* and *villages*, and gave their descriptive definitions. The positions and types of settlements that he singled out can be explained by geographical factors, cultural influences and ethnic predispositions of the population (Radovanović, 1959).

Regarding the location of towns, Cvijić highlights "natural opportunities of spacious areas - geographic conditions", the time of their establishment and the importance of communication and circulation of goods. Typological classification of towns is closely connected with the cultural zones of the Balkan Peninsula. According to those factors, he determined

three basic types of towns: 1) *Mediterranean towns*, where he singles out the *Mediterranean-Dalmatian, Albanian and Greek-Aegean varieties*; 2) *the Turkish-Byzantine (or Balkan) towns*; and 3) *the towns of patriarchal regime*. He also distinguishes the *towns of transitional type*, formed due to intermingling of cultural influences in Bosnia and Herzegovina and the old Raška (Cvijić, 1991 b).

Classification of towns according to the transport position Cvijić associated with the main geographical features of the Balkan Peninsula ("geographical features of integration and permeation"). According to this, the most important towns are located in the valleys along the longitudinal roads, at intersections or on finishing point of roads of international importance - Belgrade, Niš, Sofia, Skopje, Thessaloniki, Istanbul, Athens, Dubrovnik, Trieste and others. The importance of transport position, together with the natural and economic potentials, has enabled these cities to retain in the turbulent historical circumstances as the most important urban centers of the Balkan Peninsula. Along the transverse roads of the Balkan Peninsula, the most important towns have developed along the Zeta road and Via Egnatia (Durrës, Ohrid, Bitola, Skadar, Prizren, Djakovica, etc.), while less importance had town settlements along the transverse roads which led from Bar, Kotor, Dubrovnik and Split to the interior of the Peninsula (Cvijić, 1991 b).

Jovan Cvijić also classified towns of the Balkan Peninsula according to economic factors. Thus he singled out port with a distinctive trade function (Dubrovnik and the Adriatic towns from Split to Durrës); economic centres with a defensive function - centres of medieval districts (Novo Brdo, Trepča, Brvenik, Trnovo, etc.) and coastal towns (Kotor, Trogir, etc.); caravan station with a pronounced transport function (Berkovica, etc.); trade towns that have developed due to the famous fairs (Prilep, Stara Zagora, Larisa, Užice, Valjevo, etc.); economic centres of karst fields (Cetinje, Nevesinje, Trebinje, etc.), craft and trade towns (Janjevo, Gabrovo, etc.) and others. The importance of economic factors to the development of the towns Cvijić explained using the example of change in the direction of trade from the Adriatic coast to central Europe in the 19th century, when the towns along the transverse roads lose their importance (Užice, Novi Pazar and Pljevlja) or nearly completely disappear (Brskovo, Trepča and Novo Brdo). Only towns in the fertile valleys have remained (Prizren and Djakovica) or have become administrative centres (Sarajevo and Priština) (Carić, 1982).

Regarding the geographic position and development of *villages (rural settlements)* Cvijić emphasizes local topographic characteristics. According

to the topographical position he singled out two groups of rural settlements: 1) *villages at heights, located on the valley sides, hilly terrains and surfaces to 1 600 m*, mainly formed on the cleared land, dispersed type, with agricultural land in the village and the livestock economic orientation; and 2) *villages in the valleys, ravines and the plains*, mainly compact type, with agricultural land located outside the village. In addition, Cvijić emphasizes the influence of relief on the geographical distribution of the villages, singling *villages on morphological borders*, such as the border rocks of various resistant power, the old lake shores and lake surfaces, fluvial folds and soft slopes, and sunny sides with sediments. He further highlights the *villages on the terraces and alluvial fans, villages and summer pastures on the moraines and other glacial forms* (cirques, valleys of ancient glaciers, etc.) and *villages in karst depressions* (karst fields, large closed depressions, sinkholes, etc.).

Regardless of the wide variety of topographic position of the villages on the Balkan Peninsula, Cvijić concluded that they are exclusively formed at those sites that have the greatest economic potential. These are the contact zones of different environmental and economic areas ("*contact position of the village*"), which have secured the basis for diversified rural economy (crop farming and livestock farming) and drinking water sources (Cvijić, 1991a).

Cvijić performed the typological classification of rural settlements on the basis of their genesis and physiognomy. First he singled out two main groups of settlements: 1) *villages of a dispersed type*, which are divided into hamlets (neighbourhoods, quarters', jamaats, etc.), separated by agrarian and forest areas; and 2) *villages of a compact type*, with a dense concentration of housing and economic buildings with a garden plot. Physiognomic types of villages Cvijić interpreted by the influence of relief, forest cover, different cultures and governments. Thus the villages of dispersed type are mostly located in mountainous and wooded areas, in the cultural zone of the patriarchal regime. On the other hand, the villages of compact type are mainly located in the valleys and ravines and in the areas of Byzantine civilization, the Mediterranean-Roman culture and under firm Turkish rule (Cvijić, 1991 b). At rural settlements of dispersed type Cvijić singles out the *Stari Vlah type*, from which by the further evolution (spatial expansion and laying out straight streets in settlements) the *Šumadija, Jasenica and Mačva types* developed, then *karst type* and *Ibar or jamaat type of villages*. The villages of a compact type by Cvijić can be divided into the following types - *Timok, Čitluk, Turkish-Oriental, Mediterranean type*, at which he singles out three special types (*Greco-Mediterranean, Dalmatian-Mediterranean and Kaštelan types*), as well as *transitional type of rural settlements*.

Jovan Cvijić did not realize the physiognomic types of villages as unchangeable structural categories (Stamenković & Bačević, 1992). He clearly recognized the possibility of their transformation under the influence of change in the above factors (e.g. the formation Čitluk villages affected by the Turkish authorities and then their transformation after the liberation from the Turks and the termination of the feudal agrarian system; transformation of rural settlements due to laying out straight streets in a village under the influence of the authorities; the transformation of villages affected by changes in population occupations, etc.).

The authenticity and integrity of Cvijić's methodological and research principle in anthropogeographical studies of settlements is reflected, *inter alia*, in the above typological classification of the settlements of the Balkan Peninsula. In this way, the use of system-structural approach, intuitively somewhere, and somewhere explicitly and consistently, enabled to identify relatively homogeneous systems and subsystems of the settlements with a prominent organisation of their spatial and hierarchical structure. In this way, it is possible to determine the following content base:

1. Settlements are treated as historically dynamic category which genesis, evolution and transformation are represented by natural, social-historical, economic and civilisation conditions.
2. The geographic position of settlements is represented as chorological and historical category, which evaluation was determined by natural, historical, cultural, ethnic and economic factors that are embedded in the geographical environment.
3. The typological classification of settlements by physiognomic structure and homogeneity of the internal structure, as well as their genesis, was carried out with taking into account to the interaction of a large number of variables (natural, socio-historical, civilisation, economic, political, etc.).
4. Types of settlements that Cvijić determine on the Balkan Peninsula are relatively homogeneous and organizationally autonomous systems (and subsystems) of open type, subject to deterministic (functional) and stochastic (statistical) laws of behaviour and development of the system of settlements.
5. The spatial organisation of settlements and settlements systems is explained through the combination of natural, historical, cultural, economic, social, ethnic and religious influences, where the spatial distribution of settlements is a relatively stable category in the settlement system.

6. The hierarchical organisation of internal structure of settlements is manifested through cause-and-effect relationships that are associated with genetic, cultural-historical, demographic, functional and economic characteristics of the area, and using them it is possible to determine the relative constants and the main variables in the settlement system.
7. Settlements with their territorial framework in narrow (borders of settlements) and broad sense (borders of settlements territory), population and their activities represent a complex and dynamic anthropogeographical system in which intense relationships and connections are generated between phenomena and processes of different character.

Analogously to elements singled out, which clearly point to the implementation of the system principle, it can be concluded that Cvijić's approach in settlements researches is essentially close to modern trends of complex anthropogeographic synthesis.

Scientific achievements of Cvijić's anthropogeographical studies of settlements were continued by his associates (Vojislav Radovanović, Rista Nikolić, Atanasije Urošević, Jefto Dedijer, Milisav Lutovac, Jovan Trifunovski, Branislav Bukurov and others). Those works have played an important role in the further development of anthropogeographical method to the researches of settlements. From 1902 to 2005 was published 47 books in the edition "Settlements and Origins of Population" (Serbian Ethnographic Collections of Papers), with more than 100 monographs, dealing with different aspects of anthropogeography. Series of articles and monographs relating to anthropogeographical problems of settlements was published by certain committees of Serbian Academy of Science and Art (for studying the villages and rural areas, for population studies, for Kosovo and Metohija, etc.), Serbian Geographical Society, Matica Srpska and other institutions. It is important to highlight a scientific work of certain institutes, part of Serbian Academy of Science and Art (Geographic, Ethnographic, Balkan, Historical, Archaeological institute etc.), and departments of Geography at the Universities of Belgrade, Novi Sad, Niš, Priština, Sarajevo and Banja Luka that have published a series of articles and monographs dealing with many different aspects of settlements researches. Anthropogeographic work of great importance is "*Geografska enciklopedija naselja Srbije*" ("Geographical encyclopedia of settlements in Serbia", 2001-2002) in four volumes, written under the scientific direction of S. Stamenković and published by the Faculty of Geography – University

of Belgrade, that integrated Cvijic's concept of settlements researches and contemporary methods of anthropogeographical studies of settlements.

CONCLUSION

Geographical systems or *geosystems* are formed and developed under the general laws, which allows their typology and establishing the general rules of global and local importance. They represent a natural-historical category that by causal relationships integrates population and elements of material culture embedded in the geographic environment. Geosystems consist of subsystems (system of lower rank), but may themselves be part of the system of higher order. Therefore, it is argued that the whole geography is the science of geographical systems (Grčić, 1980). Within the geographical systems, settlements represent autonomous anthropogenic systems, which essential elements are the population and territory (material basis) (Grčić, 2008). The geographical approach to the study of settlements allows connecting the elements, factors, phenomena and processes in an integrated dynamic system, which has a territorial framework, spatial and hierarchical organisation of the internal structure, determined mechanisms of causative and effective relationships and connections in the settlements system and interaction with the environment.

Anthropogeographical systems belong to the group of complex systems. According to their spatial and structural properties they are unique and unrepeatable. For this reason, it is difficult to precisely predict the directions of their development and transformation. To be able to respond to the tasks, modern anthropogeography has enriched its new methodology with exact methods that would help to more precisely predict the consequences of various actions on anthropogeographical system. One of the methodological news, along with a series of qualitative and quantitative methods and models, is certainly a system approach.

The application of system approach, somewhere intuitively, through scientific imagination, and somewhere explicitly and consistently, forming a comprehensive, logically harmonious and precisely structured system of elements, phenomena and processes, provided authenticity to Cvijić's anthropogeographical school. System approach also gives new meaning to contemporary anthropogeographical researches. Thus the importance of system paradigm is reflected in the possibility that in the research process it integrates traditional knowledge directions with the modern trends of applied anthropogeography. In this way it is possible to generalize empirical achievements by introducing geosystem in science as a new method

of conception of geostructures, connecting into one whole all spheres of anthropogeography.

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PATRON SAINT IN ZMIJANJE - CONTEMPORARY STATE AND DIACHRONIC PROSPECT

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ABSTRACT:One of the main characteristics of the Serbs, which is not practiced by others in the Christian world, is the patron saint. It is an ancient folk custom, celebrating the home protector who was often personified in the figure of an ancestor, whose good spirit kept the house from evil spirits and helped the family in everyday life. Today, the patron saint's day is acknowledged as a holiday dedicated to a Christian saint, who figures as the protector of the family, to whom family members are related to and in whose honor the family organize celebrations pertinent to their means. The act of celebration consists of three types of ritual: blessing the feast, lifting a glass or drinking in the name of patron saint and cutting or breaking the bread for patron saint's feast. These patron saint customs are not the same everywhere, but every Serb will do duties in his home that are mandatory: pray to God for the living and the dead, making a sacrifice, gather friends and welcome guests either invited or just dropping by. In this study we compare ways of celebrating the patron saint's day in the Zmijanje region in the past and now, in order to draw attention to its importance as a family, social and religious ritual of Serb families and the importance to preserve it for future generations.

Key words: Zmijanje, Serbian tradition, patron saint, modern state, diachronic perspective

INTRODUCTION

Before they accepted Christianity Serbs were polytheistic people. In addition to the supreme god Perun, who was widely respected, every home had its local deity. By the time Christianity was introduced, the church wanted to eradicate the polytheistic beliefs and practices. First Serbian Archbishop Sava which introduced church reforms in the 13th century and entrusted the clergy not to persecute beliefs and practices but to give them a Chris-

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tian character. By entering Christian and monotheistic elements in the polytheistic beliefs and practices and the merging of several related practices result in a differences in celebrating the pre-Christian traditions, including the patron saint. "Traces of this custom had until recently all Slavs, including Indo-Europeans: Thracians, ancient Greeks, Dacians (with the remains of the Little Wallachia), the Illyrians (with the remains of at Cincars and Northern Arbanasas), Romans (lar), etc." (Petrović, 1985, 17). Until this days only Serbs kept patron saint.

The feast of a family patron saint is a household celebration in memory of the Christian saint on whose day the family converted to Christianity and who they chose as their patron and representative before God. Connection between people and saints are established by obtaining patron saint name and every year this connection is getting stronger thanks to celebration of patron saint day (Ajdačić, 2007). Within the Serbian population 78 patron saint feasts are celebrated. Most families, however, celebrate *Nikoljdan* (19th December), *Đurđevdan* (two dates – 6th May and 16th November) and *Arandjelovdan* (21st November). Besides the household patron saint feast, church and monastery festivities, village and town festivities and *esnaf*– craft guild festivities are also celebrated (Terzić, Bjeljac & Ćurčić, 2015, 109).

In addition to the huge spiritual significance for the entire Serbian nation, patron saint has its irreparable pragmatic value. Thanks to the continuous transmission of the ancestors to descendants, it identifies kinship relations and connections. Serbs often, for various reasons and circumstances, changed their surnames but not their patron saint. That is how patron saint prevented and compensated deficiencies in monitoring and determining the origin and kinship ties. Its universality, authenticity and uniqueness have significantly profiled Serbian identity. Patron saint has a special meaning in the life of Serbs. It is one of the essential characteristics of the Serbian spirituality and makes headquarters of Serbian culture. As such, patron saint has often been the subject of study of many ethnologists, perhaps more than other ethnological issues, and so will be in this paper as well (paper was created within the project "Study and Protection of the Intangible Cultural Heritage of Republic of Srpska" conducted by the Faculty of Philology, University of Banja Luka, which is financially supported by Ministry of Science and Technology of the Republic of Srpska). Within this paper we will show celebration of the patron saint of the Zmijanje region recorded during field research carried out in July of year 2013. Several interviews were conducted with the informants as recording the modern state of patron saint, based on reconstructed memories of the

celebration of the patron saint of the past. In addition to this, researches of the way of celebrating patron saint was conducted within families that moved from Zmijanje region to Banja Luka, as well as in several immigrant families that moved to Sremska Mitrovica, Serbia, in the seventies of the 20th century. The obtained data were compared with the existing literature and thus are recorded and shown changes occurring in the celebration of the patron saint now and then.

GEOGRAPHICAL POSITION OF ZMIJANJE

Zmijanje is an area in northwestern Bosnia, in the western part of the Republic of Srpska respectively, inhabited by Serbian population. In the administrative-territorial aspect Zmijanje does not exist as a separate organizational unit. It is located in the border area of the City of Banja Luka, as well as municipalities of Mrkonjić Grad, Sanski Most and Ključ. Published historical sources shows that Zmijanje existed throughout history as an administrative-territorial unit and that by the end of the 13th century Zmijanje is represented by Bosnian parish Zemljanik (Karanović, 1936, 27). During the Turkish conquest by the half of the 16th century, Zmijanje is organized as a district – *nahija*, a status which was held by the early 19th century (Skarić, 1937, 37). These historical sources also reveals that, in this period, Zmijanje was frequently changing boundaries and that held the largest territory in the first half of the 16th century, covering area between the Vrbas and Sana rivers and mountains Kozara, Dimitor and Lisina.

There are proportionally a lot of data about people's understanding of Zmijanje, which show that this area is understood in its different territorial contexts. The first data on people's perception of Zmijanje brings literate Petar Kočić, and based on his research Zmijanje was locate as area of a village Ratkovo as well as area of several villages on the stretch Kadina Voda – Čađavica. Furthermore, Zmijanje was understood as a much larger area bounded by the rivers Sana and Vrbas on the West and East and Kozara mountain and the source of the Pliva river in the North and South (Kočić, 1986, 5-6). With the problem of determining Zmijanje boundaries dealt also Milan Karanović. On the basis of anthropological and geographical studies he found that Zmijanje is area bounded by the river Vrbas and Sana in the East and West, line Banjaluka – Sanski Most in the North and the source of the Pliva river in the South (Karanović, 1926, 139-140).

According to recent sources Zmijanje is located in a hilly area between rivers Sana and Vrbas, which represents its eastern and western borders. With its northern part Zmijanje reaches out to City of Banja Luka,

and with its southern part to the Mrkonjić Grad. It is Zmijanje in the wider sense of the term, while short-term Zmijanje is limited to the area of the village "Kadina Voda – Čađavica, with local centers in Stričići and Sitnica. This group includes the following villages: Stričići, Lusići, Dujakovci, Lokvari, Sitnica, Donje Ratkovo, Gornje Ratkovo, Stražice and Sokolovo" (Niškanović, 1979, 8). By the Dayton Agreement in November of 1995 Zmijanje became a border area of the Republic of Srpska and Federation of Bosnia and Herzegovina.

ON THE ORIGIN OF ZMIJANJE POPULATION

We found fragmentary material published on population and settlements of Zmijanje region in the literature of the late 19th century. Although in the early 20th century, based on scientific research and on tradition and historical sources, attempts were made to clarify the origin of Zmijanje population.

The first field research under the direction of Jovan Cvijić was made by Petar Kočić in year 1909. His research goes only to the extent to substantiate the thesis that the Zmijanje region was "from immemorial undoubtedly Serb land" although he found that in addition to the older layer there is a layer of recent population (Niškanović, 1979, 8). His research continues and confirms Milan Karanović but with no new information.

In addition to anthropogeography research, attempts have been made to clarify the origin of the population of northwestern Bosnia from the historical aspect. So, Petar N. Gaković stresses that Bosanska Krajina always populated by Serbs, that there was not immigration, but only very expansive emigration as we have in Montenegro and Herzegovina (Niškanović, 1979, 9). In contrast Vladislav Skarić pointed out that the population of northwestern Bosnia has dual origin. Older immigrants are from Herzegovina and Montenegro, and the population of more recent origin are from "western hill region" and northern Dalmatia (Skarić, 1918, 219-265).

Only research that was conducted by Milan Vasić on the basis of the Turkish census – *defteri* allow us to create a complete picture of the population and socio-economic relations at time when ethnic movements in northwestern Bosnia was the liveliest. After the Turkish conquest in 1527/8 this area is formed as district Zmijanje, which was first registered in census in year 1541. From census composed around 1563, we notice that between the two censuses a new district Trijebovo is formed, which covered the southeastern part of Zmijanje district. According to these two



Fig. 1. Geographical position of Zmijanje (Medar-Tanjga, 2007)

censuses Vasić concludes that Zmijanje settlements already quite stable and there was no immigration or emigration of the population. Most villages mentioned in these documents are still present today. The inhabitants are Orthodox Serbs and in the aforementioned census majority are registered under the first name of his father, instead of the last name,

but there are also formed surname. There has been only a few cases of Islamization. Vasić eventually concludes that Zmijanje residents which are listed in the oldest Turkish registers and who continuously live in Zmijanje till today are not settled after the Turkish conquest, and question remains whether they are immigrants from the pre-Turkish period or natives (Niškanović, 1979, 9–10).

At the end of the 19th century Zmijanje was relatively sparsely populated area. Until the seventh decade of the 20th century, with the exception of a short period immediately after the First and Second World War, the population was increasing. Since the end of the sixth decade of the 20th century Zmijanje is experienced a process of population emigration. Scheduled emigration affect only one part of the Zmijanje villages (Dobrnja, Vilusi, Radmanići), while in other villages emigration takes place spontaneously. Villages of the central part of Zmijanje are the most affected by uncontrolled emigration, whose population is mostly emigrated to Bačka, Banat, Srem and Slavonia in Serbia and Croatia and around Banja Luka and in Lijevo field.

The disintegration of the former Yugoslavia and the war in this region are the cause of massive refugee of Zmijanje population. Most of the houses and facilities, churches and schools of Zmijanje villages were destroyed and burned. This is the main reason that after the signing of the Dayton Agreement in 1995 only a small percentage of the population returned to their homes.

PATRON SAINT IN ZMIJANJE

Residents of Zmijanje, faithful guardians of the Orthodox faith and customs, by nature quite lively, cheerful, endowed with life and varied sensitivity, has always lived a patriarchal life. As typical representatives of Dinara type population (Cvijić, 1991), are completely tied to their country and the nature of their region. Hence it follows that the patron saint seated in their lives and for them it is sacred as Christmas or Easter.

In this region patron saint is celebrated since beginning of time, as they point out with pride and there was no single year that patron saint was not celebrated. Whoever, inherits the house and land inherits a patron saint as well. The unwritten rule is that all the sons feast patron saint in their father's house while the father is alive. Although there are cases that if son separate from the fathers house and move into their own house, celebrates patron saint in new home. In that occasion in the Zm-

ijanje villages son is seeking fathers permission to feast patron saint in their own home with his guests. Family settled in cities of Banja Luka and Sremska Mitrovica coopt the patron saint from the father in the way that son took away a piece of holly bread of the last patron saint feast which they celebrated together to his new home and from that day son continues to feast patron saint at his home. In the houses that were had a fatality in that year, patron saint is celebrated but without joy and fun.

Some families feast patron saint two, and some three days: the first day – patron saint or *lice*, second day – *pojitarce* and third day – *zajitarce*. If the patron saint is going to be celebrated on the third day depends on which saint goes after a patron saint (those whose patron saint is St George celebrate two days because the third day is St Marko, so they goes to others families patron saint feast). If the patron saint feast falls on Friday, third day is celebrated because it is Sunday and if it is another day usually there is no any celebration. The main guests comes on the first day of patron saint feast, and on other days less important guests and those who for some reason have not managed to get the first day comes. Relatives – *svojat* are not specially invited to patron saint feast because they know when to come and they duty is to come. Friends are invited only for the first time when we met them accidentally. Sometimes host goes to their houses ten days before the patron saint feast in order to invite them. Host is not carrying any presents to friend house and just drink coffee and ask them politely to his house to patron saint feast. It is understood that the one who came to patron saint feast comes every year. For those who regularly come to each other for the Patron saint feast they are saying that “they are loaning for the patron saint”. If someone don’t comes to patron saint two years in a role no one will go on their patron saint feast as well. This rule does not apply to relatives. In recent years, younger hosts in Banja Luka and Sremska Mitrovica, invite your guests by telephone, a few days before the patron saint, to remind them to come and to confirm their arrival.

Preparations for the patron saint lasts throughout the year, because it needs to get everything you need for feast. Host leaves the best brandy – *rakija*, pig or sheep to roast, collects the cream – *kajmak*, cheese are prepared, as well as wheat for patron saint bread and for holly wheat – *koljivo*. Drinks and roast are prepared by the host two to three days before feast. In addition soups, pies, cabbage rolls, donuts – *kolačići* and cakes and sweet are prepared and it’s a woman job. During patron saint Zmijanje villagers brings meatless food on the table, although most hosts are serving meat as well. However, they read prayers over meatless food, regardless of whether it serves meat or meatless table. In the last five to

six years for the patron saint it is mandatory that holly wheat are blessed by the priest in the church, although in the past in the Zmijanje villages holly wheat was not served. Wheat has been introduced by a new priest, who said he would not read prayers if there is no holly wheat. Housewife cooked sweetened wheat with nuts and decorated it with sugar cubes. Holly wheat are served by a woman to the guests while reading the prayers. For those who come later holly wheat is served first and then guests sit for patron saint feast dining table. Holly wheat that remains after celebrating are divided to animals.

Patron saint bread – *slavni kru'* is previously prepared by housewife but since five years ago it can be bought in bakeries which are making bread especially for these occasions. Older housewives are still baking it by themselves on the eve of feast. Patron saint bread is kneaded from wheat flour, salt and water and housewives make sure it is kneaded by her right hand. Decorated with the braids which are placed in a cross and the ornaments made with patron saint stamp. In the Zmijanje villages patron saint bread are not brought to church because the priest consecrate it when reading patron saint prayers. In cities housewives prepare holly wheat, patron saint bread, wine and at patron saint day it is worn to church for the priest to consecrate it.



Fig. 2. Patron saint stamp
(Photo: I. Medar-Tanjga, 2013)



Fig. 3. Patron saint candle
(Photo: I. Medar-Tanjga, 2013)

Patron saint wax candle – *slavna svijeća* are made from domestic wax. Wax is bought from someone in the village who has bees. Candle is made in a way that wax is warmed enough so it is soft as dough, and housewife use hands

to spin it around hemp thread. Next, candle is coiled into a circle, with end that is straightened up and which is lights up. Sometime it trims by sugar cubes or coins. This candle burns during the patron saint on a piece of patron saint bread. As candle burns down, it is unwind little by little so that the part that burns always stands up. More recently candles are bought in the church and placed on patron saint table in a pot filled with holly wheat. Candle is lights by the host when guests gather, just before reading the payers. Patron saint candle goes out with wet fingers or it is poured with wine or brandy when folks go to sleep. On the second and third day of patron saint, when guests gather, candle is lit and a prayers (*Očenaš and Slava*) is red. Candle that remains from the patron saint is kept in the house and is lit in case of inclement weather with a chance of rain.

On the day of patron saint final preparations in the household are made. Dishes are set on the table as well as patron saint bread, candles, drinks and holly wheat. Bowl with stew is set on the table (previously it was sauerkraut or crushed beans, and today is usually soup or cabbage rolls), on top of bowl with stew goes patron saint bread and patron saint candle as well as glass of brandy and a prayer is red.

Guests start to arrive about midday. Host greets guests at the door of his home and serves them brandy while they congratulate him patron saint. Guests bring presents of grace, which consist of: fruits, coffee, juice and candy if there are children in the home. Previously, the grace was shared between household members in the way that guest give to each household member grace just for this member. Today the hostess takes the bag in which is presents of grace for all.

When all guests arrived and the priest came, candle is lit and the patron saint is red. If there is no priest, and in the Zmijanje villages it was almost the rule, then patron saint person – *slavnik* is host or someone who knows how to read prayers. He stands with the other guests on the western side of the table, facing the East wall where there is an icon and reads four major prayers (*Očenaš, Bogorodice dijevo, Simbol vjere and Slava*). While reading prayers hostess censes everyone starting from patron saint person and moves to the right, as well as all the rooms in the house. Patron saint person raises a glass of wine (previously patron saint person rose a glass of brandy because rose wine wasn't served) and delivers the toast to the guest who is the opposite of it on the East side of patron saint table and drinks wine. This guest toast and drink and further deliver toast to the opposite guest on the North side of the table and this guest toast and drink and further deliver toasts to the opposite guest on the South side of the table. With this kind of toasting they form a cross. After that all

guests make a toast with brandy starting from patron saint person to the right. This toasts in the cross formation is repeated three times from the same glass with a brandy called: Krsna, Slavna and Krstu poklonjena. If it is accepted by the host that he use wine for toasting, then only first toast in the cross formation is done with wine, and the other two with brandy. Then he start to breaks patron saint bread. If there is a priest present it will be done by him, along with host and two more guests. Breaking of patron saint bread in the way that patron saint bred is turned three times to the right, then cut crosswise with a knife, spilled with wine, then patron saint bred is broke, kissed by hosts a priest for three times in the row. If there is no priest bread will be crossed by host or patron saint person. In the past, the patron saint bread was not spilled with anything. In homes that use twisted candles, quarter of a broken patron saint bread is left on the table, and a candle is placed on it, which stands there for all the days of patron saint. The rest of the bread is divided to the guests. In the past in Zmijanje villages before sitting and veneration guest sang the patron saint song that goes like this:

Who celebrates the Patron saint, the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

Who mention the Patron saint, in the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

Who baking this cake, in the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

Housewife mixing it, in the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

Who light a Patron saint candle, in the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

We drink and sing, in the glory of God
dear God supported him, and the glory of God
and this dinner with justice acquired.

The patron saint song today is not sung nor in the Zmijanje villages, nor in the city. After the song or today after reading the patron saint food is

brought to the table and treat in on the way. Before this contemporary times a roasted suckling pig is brought to the table necessarily with stewed cabbage, mashed beans, cheese, cream, pie – *polaguša*, donuts – *kolačići* and dried meat. Today it is impossible to patron saint passes without soup, cabbage rolls, sweet pastries and cakes. Previously, during the patron saint feast it was mandatory to perform toasts with drink. It was done by some of the guests who was acquainted with it, and usually those people were famous in the villages by performing toast drink. In the Zmijanje villages people which are skilled toasting can still be found even among younger persons, while in urban areas the custom of almost completely lost. It is celebrated late into the night with joy and song. The host serves guests throughout the patron saint feast, stands and monitors whether someone lacks something. If the host is too old to serve the patron saint or if during the feast gets tired, he can be relived by some of the younger male members of the household. When escorting guests, host prepare something of feast for them to go.

On second day – *pojitarce* and third day – *zajitarce* the same ritual is repeated, with the difference that instead priest reads patron saint somebody of household member does it. Guests arrive earlier and earlier diverge.

Most families served and a small votive patron saint, which is served when something bad happens to someone from the family and he/she survive it. If someone had more accidents in life, only one votive patron saint is served, and at the advice of a priest it is always the one that is related to the first, but allocate to all accidents. The votive patron saint is not inherited. Family of person for whom votive patron saint is served and respect continues to celebrate this patron saint, while other family members no. If a person inherits the land in the female line votive patron saint is served as well as patron saint celebrated in that family, because of the patron saint is related to the land.

It is often the case that women vow so-called female saints (*Sveta Petka, Bogorodica, Gospojina, Ognjena Marija, Aranđelovdan*). All vows are celebrated on the eve of the saint. Not rich food is made, only it is important to have the entire loaf of bread. A little better dinner is made, a candle is lit, house is censed and patron saint is red. Only close family attend and once they start to celebrate it is wrong to interrupt them.

Following pages will show differences in the celebration of the patron saint of the Zmijanje population, comparing data from literature with materials collected in the field research. In particular, ways of celebrating in the village and in urban area are shown in order to detect changes caused by modern urban lifestyle.

Table 1. *Diachronic analysis of celebrating the Patron saint*

	Literature ¹	Older informants ²	Existing situation in villages ³	Existing situation in cities ⁴
Time	three days	patron saint day, second day – <i>pojitarce</i> , third day – <i>zajitarce</i>	patron saint day, second day – <i>pojitarce</i> , third day – <i>zajitarce</i>	patron saint day, second day – <i>pojitarce</i> , third day – <i>zajitarce</i>
Space	house	house	house	house and church
Participants	family and guests	family and guests	family and guests	family, guests and priest
Props	3 loafs of bred (on first goes cheese, on second candle, and on third holly wheat), candle, censer – <i>kandilo</i> , wine, holly wheat – <i>koljivo</i>	patron saint bread – <i>slavni kru'</i> , candle, censer – <i>kandilo</i> , brandy – <i>rakija</i> , roast	patron saint bread – <i>slavni kru'</i> , candle, censer – <i>kandilo</i> , brandy – <i>rakija</i> , somewhere vine, somewhere holly wheat – <i>koljivo</i> , roast	patron saint bread – <i>slavni kru'</i> , candle, censer – <i>kandilo</i> , brandy – <i>rakija</i> , vine, holly wheat – <i>koljivo</i> , roast
Activities	<ul style="list-style-type: none"> • preparation • inviting of guests • patron saint reading • toasts • breaking of bread • lunch serving 	<ul style="list-style-type: none"> • preparation • inviting of guests • patron saint reading • toasts in cross formation • breaking of bread • singing Pa-tron saint song • lunch serving • toasts 	<ul style="list-style-type: none"> • preparation • inviting of guests • patron saint reading • toasts in cross formation • breaking of bread • lunch serving • toasts 	<ul style="list-style-type: none"> • preparation • remaining of guests • patron saint reading • somewhere toasts in cross formation • breaking of bread • lunch serving
Presents	-	individually delivered to each household member	deliver to a host for all household members	deliver to a host for all household members

Digital Archive of Philology, University of Banja Luka.

Remarks:

1. M. Karanović (1932, 85–91)

2. The data collected in the field research in Zmijanje region of the older narrator of which the oldest is 76 years old and told data from his childhood, as well as the stories of his ancestors, Digital Archive of Philology, University of Banja Luka.

3. The data recorded in the field research in Banja Luka in July of 2013, Digital Archive of the Faculty of Philology, University of Banja Luka.

4. The data recorded on the ground in Sremska Mitovica, Serbia in December of 2012.

The only record that refers to the celebration of the patron saint of the Zmijanje gave Milan Karanović, back in year 1932. Although there are no detailed description of the way of celebrating the patron saint, nor shown the course and all the ritual acts that are practiced on this holiday, the priceless treasure of his work are the toasts that Karanović recorded, which is not possible to be found and recorded anymore. Comparing records from the literature with the situation existing in the field and with the older data obtained from narrators, we can conclude that this custom has suffered some changes, which are the result of lifestyle changes, forgetting the traditions and greater interference of priests in ritual of celebration. Timing and participants have remained the same, as well as the place where the celebration are performed, if it is a celebration in the countryside, but in towns celebrations is performed in the home and going to church is mandatory in order to bless the patron saint bread and holly wheat. The most interesting situation is recorded when it comes to props used, because Karanović record referred holly wheat and wine, as mandatory elements of patron saint, while older narrators says that the holly wheat was not previously prepared and how the wine was not toasted. This elements is introduced by priests, so today in Zmijanje we have households that celebrate without holly wheat, wine and priests, and there are households where priest comes to the house and reads the patron saint on holly wheat and broken bread with pouring wine. In urban areas holly wheat is a mandatory element of the patron saint. Patron saint actions are also partially modified. Karanović paper does not mention toasting in the cross formation, but this can be attributed to the partial and incomplete description of the celebration. This toast is kept up to date and in the countryside and in the city, although there are cases that younger celebrators in cities do not know this. In the past toasts were been necessarily in patron saint ritual. Today, younger people who are skilled toasting can be found in the villages, while in the cities this ritual is almost completely disappeared. Other special offers actions in the past have been retained to the present day, with the difference that some (reading of patron saint, patron saint bread) is taken by the priest.

CONCLUSION

The celebration of the patron saint is a very old custom, characteristic for the Serbs as a whole, which is transmitted through the male line, from father to son. The cult of ancestor – the local patron today been replaced by the cult of the saint who is celebrated and to whome goes prays for health

and prosperity. The ancient custom of the church was accepted, but it was changed into his clothes.

Patron saint is primarily a spiritual event, and then a social holiday. All this is visible through burning candles, cense, reading patron saint, patron saint bread and practicing other patron saint customs and regulations. However, patron saint social aspect became dominant, and sometimes it is the only one. However, the celebration of the patron saint is preserved to this day, although somewhat modified compared to the records of the past. It differs from place to place, but there are differences in how it is celebrated in the village and in town. The village is the guardian of traditions and it is still celebrated in the traditional way, while in the cities patron saint as part of the family identity often loses its spiritual vertical and gets qualities prestigious celebration. Patron saint is greatly changed, codes of conduct related to the Christian name are quite mitigated. While once only male members sitting around the table, today is generally accepted and the presence of women. However, with the exception of holly wheat, which is currently preparing for the celebration, there was no difference in patron saint actions and objects. As we once have burned candles, broke patron saint bread, red patron saint, today we do the same, and as such patron saint is included on the Preliminary list of intangible cultural heritage of the Republic of Srpska. It should be added that the Serbia in 2013 nominated celebration of patron saint, as an element characteristic of Orthodox Christian family, which recognize the Serbs as a way of expressing ethnic identity, for the conservation of the UNESCO's list, and in November of 2014 patron saint was included on the UNESCO Representative List intangible cultural heritage of the World. This nomination should be joined by the Serbs of Bosnia and Herzegovina, which celebrates the patron saint and experiencing in the same way. From the very actors of this custom, but also from the local community and the state, which must understand the value and importance of tradition and find a way to protect it, depends on whether these segments of tradition will preserve continuity in duration and function as an important factor of identity of local community.

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THE HISTORICAL-DEMOGRAPHIC STUDY OF JEWS IN BELGRADE 1717 TO 1941

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ABSTRACT: The first records of Jews in Belgrade date from the middle of the tenth-century. The Jewish ethnic colony in Belgrade was established during XIII and XIV centuries with an organized religious municipality. The Spanish Jews began to arrive in 1521 with the establishment of Turkish administration in Belgrade. The period from 1717 to 1941 was characterized by strong, centuries long dynamic demographic processes of Jewish population in Belgrade. The nature of dynamic changes can be seen in the waves of emigrations and immigrations, changes in the total number of Jewish population and entire changes in the structure of Jewish population, their families and households. The presence of Jews, and their rich cultural tradition became an inseparable and important part of Belgrade. After the Constitution in 1888 which gave them equal rights, the benefits of presence of the Jews in Serbia were manifested to their full extent. The fascist occupation of Yugoslavia began with the bombardment of Belgrade on 6 April 1941. It was the beginning of suffering of the Serbian people, but also of the Jews.

Key words: Jews, Serbia, Belgrade, demography

INTRODUCTION

Ethnic heterogeneity of Serbia is conditioned by the development of the society as a whole and diverse historic events that effected immigrations of particular nations or smaller groups of the same nationality. In that respect, Jewish community with its rich religious and cultural tradition as an important part of the history of Serbian people has a very important role in the ethnic structure of the population of Republic of Serbia. It can be said that specific characteristics of the Jewish population – Sephards and Ashkenazi

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in Belgrade were of importance for Serbia and the feeling of belonging to a nation such as Jewish enabled us to study Jewish population in Belgrade from a demographic and statistical aspect. The data on the ethnic characteristics of Jews in Belgrade was obtained from the population census in different periods of time on the geo space of Belgrade that helped us analyze all variations in the Jewish population number in Belgrade from 1717–1941, as well as their population changes and the inner ethnic characteristics. Our demographic study defined variations of the total number of Jews, their age and sex structure, size and number of Jewish household members, marital status and characteristics of the mother tongue of Jews in Belgrade. Characteristics observed in the period of 1717–1941 which clearly show long term changes in natural migrations of Jewish population in Belgrade, due to very dynamic and complex historic changes in Serbia within the entire time frame in which the Jewish population has been studied are defined.

METHODOLOGY

For historical-demographic study of Jewish population in Belgrade in the period of 1717 до 1941 we have opted for more reasons. Firstly, there was a reliable historic data, census of Belgrade Jews dating from 1717, and the fact that historic-demographic continuity can be undoubtedly and clearly followed through historiography of Jews in Belgrade. Secondly, preserved archives documents from 1824, 1827, 1834, 1836, 1855, 1868, 1883, 1890, 1895, 1900, 1910, 1921, 1931, ending with 1941 when thousands of Belgrade Jews were killed obviously offer a number of possibilities for their demographic study and analysis as well as statistical processing and presentation of study results obtained. Also, up to the present day no serious study of such type or content has been undertaken. Using historic-demographic and historic-anthropogeographic methodology all the demographic changes of Jewish population in Belgrade were observed. The main methodological approach is based on demographic and statistical aspect of studies of all relevant indicators of the total number, size of Jewish population in Belgrade in the time span of 224 years (1717–1941). All the data is based on population censuses of Belgrade and particularly of Jews. We have used, to this aim, methodology of archive research and the archives on Jews that have been unknown to the scientific public and are in the National Archive of the Republic of Serbia. The documents used are as follows: In the National Archive of the Republic of Serbia.

Our aim was to observe demographic changes in Jewish population (Sephardic and Ashkenazi) in the geo space of Belgrade (without Zemun)

the capital of Serbia. This paper used all the data from the census results of Belgrade Jews which are kept in the Republic Bureau of Statistics of Serbia. We have conducted a qualitative and quantitative analysis of the census of Jews also, according to the data of census results we statistically analysed, processed and presented the data obtained in order to make comprehending of this very demanding topic easier. Richness of information and the data, we believe, can offer an overall picture of Jewish population in Belgrade, Jewish families, their households and their characteristics.

ANALYSIS

The first mention of the Jews in Belgrade dates from the middle of X century, more precisely 950 in the correspondence between Kordoba rabbi Hisdai ibn Saprut and Khazars khagan Joseph XI. In this writing Belgrade and Belgrade Jews are mentioned. Jewish ethnic colony in Belgrade was formed during XIII and XIV century, and as such had very developed merchant relations with Jews in Dubrovnik, Venice, Ancona and Hungary. Belgrade Jews had an established religious municipality. Most of Belgrade Jews of the time originated from trade centres in the Balkans, i.e. Greece and Bulgaria, where they had formed religious centres before. It is assumed that they arrived from those areas even before the big expulsion from the middle Europe, especially Hungary, at the end of X century and increased an already large Belgrade Jewish colony. In the middle of XIV century a great wave of Jews from Germany and Germany fled to Thessalonica and Constantinople for Turkey and territory under the Turkish administration which was lacking tradesmen and craftsmen. At the same time, the Jews were promised civil freedom. Many of them having followed Ottoman invasion came to Belgrade and stayed there (Jovanović, 1992).

With the fall of Belgrade under the Turkish rule in 1521 there began immigration of Spanish Jews. In the meantime, their Sava settlement (beside the river Sava) in Belgrade was moved from the other side of Belgrade fortress, near larger bank of the river Danube (Belgrade lies on the confluence of the Sava and the Danube). The reasons for this are not known. At that time Spanish was the language of communication among the Belgrade Jews, who were dealing with the trade and banking (Jovanović, 1992).

Owing to the writings of Yichak Almozlin, the son of Joseph rabbi, tragedy of Belgrade Jews after the Austrian taking over of Belgrade in 1688, followed by their expulsion into prisoner camp in Nicolsburgh in Moravska is known. When after the Karlovac treaty in 1699 those who survived came back found all synagogues, the school and the Jewish municipality pulled

down. They were so few in number that they could not renovate anything for a long period of time.

During the second taking over of Belgrade in 1717 the Austrians found only 47 Jewish families (34 Sephards and 13 Ashkenazi) mainly poor ones, with around 250 members of household. The total number of population in Belgrade was not above 5.000 individuals. (Perić & Stanić, 1992). The consequences of fierce battles for Belgrade, the damaged fortress and burnt town with a large number of pulled down buildings, especially mosques, the new authorities, taking this taking over as a final one, tried to restore it according to their own taste. From an oriental Belgrade of the time they intended to build a settlement of mid European type. It should be noted that in the 22 year long period of Austrian rule of Belgrade the first significant closer ties between the Jews and the Serbs were established.

Jews were the most literate part of population in Belgrade, who besides knowing Spanish and German, often delivered their pleadings and complaints to the Austrian authorities in Serbian using Cyrillic alphabet. (Jovanović, 1992). By the regulation received from Istanbul in 1824, which the Vizier read on 21 May to the gathered members of the Jewish community, the Jews were exempted from any imperial service, particularly from *djumruk* (*djumruk* is a Turkish expression for the Customs) and replaced them by the Serbs. The Belgrade Jews carried on dealing with trade and crafts as they had done before. From "Tefter aracki varoši beogradske" for 1825 it can be seen that there were 208 Jewish tax payers with 114 Jewish family heads. Apart from the families mentioned, there were some more Jews noted separately as craftsmen: *bakal* (grocer) 1, *mehandžija* (inn keeper) 1, *tutundžija* (tobacco tradesman), *terzija* (tailor) 9, *kazaz* (craftsman for textile decoration) 5, *tenečedžija* (craftsman for making white tin dishes) 2, *gabeledžija* 2 and *kačkavaldžija* 1. (Perić & Stanić, 1992). *Tefter aracki varoši beogradske* from 1827 has been preserved, too. From it, we can see that Belgrade had 239 Jewish tax payers. In addition to it, there were numbered as follows: *bakal* 3, *mehandžija* 2, *tutundžija* 1, *terzija* 16, *telal* 1, *kazaz* 5, *tenečedžija* 1, *sarač* (craftsman that deals with leather) 1, *hećim* (doctor) 1, and finally 22 more individuals noted together as teachers, priests and pupils. In the list of craftsmen from 1836 it says that Belgrade Jews were : *boltadžija* (traders of luxury industrial goods) 80, *bakal* 2, *terzija* 3, *mehandžija* 2, *magazadžija* 1, *tenečedžija* 5, *spekulant* 4, *duvandžija* 1, *sarač* 4, *kazaz* 4, *komisionar* 2, total 108 (Djordjević, 1925).

The Jewish craftsmen did not join Serbian guilds but they got together as a union of solidarity ready to protect and help each other in need. If they considered things not to be fair for their community they would

unite in the assembly asking for the clarification. In October, 1834 they complained to prince Miloš about the strict conditions for tax payments asking for more human treatment. The prince immediately ordered that they should not be treated in a rough way. But a year later, they in solidarity refused to pay the tax, claiming they had to pay more than the others. As this was not true, they made the Prince furious and even 50 of them found themselves in prison. According to the first complete census in Serbia in 1834 there were around 2000 Jews, out of which less than 1500 inhabitants. Number of all Belgrade inhabitants in those years was reduced to 20000, due to the Turks withdrawal. According to the data of prince Miloš's doctor Kunibert there were 1.530 Jews in Belgrade living in 210 houses in 1838. Eight years later it was noted that there were 1.724 of them (which makes 7% of the total number of the inhabitants), but there is no precise data on the number of houses. (Slang, 1926). According to Slang, Sephards were the predominant majority while there were only 200 Ashkenazi (considered as more skilled craftsmen). Since the proclamation of autonomy of Serbia in 1830, the Jews were treated as Serbs in citizen relations. When prince's brother Jevrem arrived in Belgrade on 25 of November in 1831 to take over the duty of the Belgrade governor, he gathered the noble inhabitants of Belgrade, Savamala and Palilula of our and Jewish faith so that he could read and tell them how they should behave in prosperity (Slang, 1926).

During seventies and eighties of XIX century more Jews inhabited Belgrade. Thus, the Jewish community in Belgrade came into second place. When Belgrade had more than 50.000 inhabitants, there were 2.125 Jews in 1883 while in 1889 there were 4.341 inhabitants. Their presence was an inseparable and also an important detail of Belgrade. During the rule of Milan Obrenović (1868—1889), when the rights of the Jews were legalized. The first official naming of the streets in Belgrade was done in 1872. The two most important streets (sokaci) in Jewish mahala (part of town) received names The Jewish (street) and Moses (street). Jewish street apart from 1943-53) retained its continuity until today, while Moses street (like Jewish mahala itself) disappeared in an urban planning after World War II (Lebl, 2001).

Period from 1868 to 1888 presents a final phase in the affirmation of unequal citizen rights of Belgrade Jews. By wide cultural and political humanitarian engagement the Belgrade Jews achieved their positions preparing themselves to, after the Constitutional equalizing of rights in 1888, show all the benefits of their existence in Serbia in the years to come. Although international and inner circumstances were favourable, many Jews individually or in groups showed great enthusiasm during this

twenty year long period thus turning their legal equality with others into a formality very soon. The first joy in that sense was brought by the thirty fifth article of Serbian Constitution from 1869, in accordance to which all the Jews had to be recruited into Serbian army. For centuries, as non Moslem population in Turkey they had been deprived of the army service and had to pay taxes as a ransom. New regulation was accepted by Jews with an unhidden joy and pleasure, accepted as a 'holy duty' that had to be carried out with good will and consciousness. According to the letter of a Jew from Šabac, his compatriots accepted this as God providence, as they felt how sad is the destiny of the one who loves his homeland with all his heart while the people around him consider him as a stranger with no rights. Moreover, they were allowed to eat food in the army according to their religious rules.

RESEARCH RESULTS

According to the census carried out by Austrian Hungarians in 1717, there were 47 Jewish families of 250 inhabitants living in Belgrade. There are no records of the number of Jews for the period from 1717 to 1825. It was noted in 'defter' from 1825 that Belgrade had 208 Jewish tax payers with 114 households, while 'defter' from 1827 noted only 239 Jewish taxpayers. According to the data from 1833 there were 18.000 inhabitants in Belgrade, out of which there were 1500 Jews or 8,3% population of the town. Five years later, in 1838 there were 1.530 Jews living in Belgrade while in 1845 there were 363 Jewish families with 1.087 inhabitants.

Table 1. *Course of Jewish population in Belgrade from 1717 to 1931*

Year	Number of Jews	Year	Number of Jews
1717	250	1874	1.754
1825	208	1884	2.177
1827	239	1890	2.729
1833	1.500	1895	3.097
1838	1.530	1900	3.730
1845	1.087	1905	-
1856	1.506	1910	4.192
1862	2.000	1921	4.844
1868	1.200	1931	7.906

Reference: Perić & Stanić (1992)

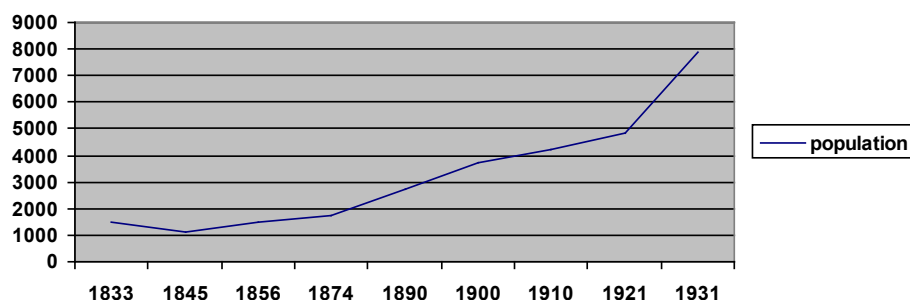


Fig. 1. Course of the total number of the Jews in Belgrade from 1833 to 1931

We have elaborated data on the census of Jews in 1856 on the basis of which we can conduct more precise demographic analysis of Jewish population in Belgrade. According to this census there were 1506 Jews in 286 households living in Belgrade. In relation to the age structure a younger middle age population is dominant, then follow older middle age population (40-59 years of age) with 27.5%, old population (60 and above) with 7.2% and young population (up to 19 years of age) with participation of 2.5% in the total population of Jews in Belgrade.

Table 2. Jewish population in Belgrade according to large age groups from 1856 census

Age	Population
0 – 19	8
20 – 39	183
40 – 59	85
60 and more	22
Unknown	11
TOTAL	309

Reference: Archives of Serbia.
Fund: Ministry of Interior affairs List of Jews in Belgrade from 6 June 1856

▼ Fig. 2. Jewish population in Belgrade according to large age groups from 1856 census

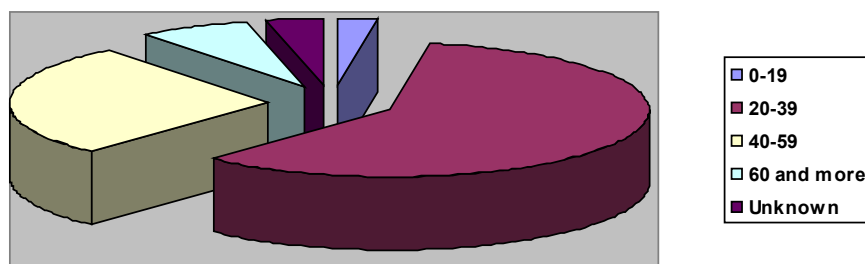


Table 3. *Jewish households in Belgrade according to the number of family members from 1856 census*

Household size	Number of households
With one member	8
With two members	19
With three members	35
With four members	68
With five members	41
With six members	44
With seven members	26
With eight members	25
With nine members	7
With ten members	5
With eleven members	2
With twelve members	3
With thirteen members	3
TOTAL	286

Reference: Archives of Serbia. Fund: Ministry of Interior dela.Upraviteljstvo town Beograd.
List of Jews in Belgrade from 6 June 1856

In the structure of Jewish households according to the number of family members, households of 34 members are dominant, 68 or 23.7% of all Jewish households, then follow six member families, total number 44 (participation of 15.3%), five member families 41 (participation of 14.3%), and three member families 35 (participation of 12.2%). The least number of households is with 11 members in 2 households (participation 1%). Census from 1856 (Archive, List of Jews in Belgrade from 6 June 1856), also noted 914 children, out of which 451 were of male sex and 463 of female sex. An average age of Jews in Belgrade, according to this census, was 36.6 years of age.

According to the data from 1862 there were 2000 Jews living in Belgrade, while according to the data from 1868 there were 219 Jewish tax payers with 1200 inhabitants. Census from 1874 presents (Perić & Stanić, 1992) some more elaborate data on the population. There were, according to this data, 1754 Jews placed on record i.e. 6.3% of the population of the town. Out of the total number of the Jews in Serbia 2049, 1.754 or 85.6% lived in Belgrade. Female number was, according to the

census, somewhat higher than the male one and was 900 female and 854 male. We found a marital structure very interesting as number of married men and married women was equal 293, which led us to the conclusion that the Jews married exclusively among themselves. The following census (Perić & Stanić, 1992) in Serbia was conducted in 1884. There were 35.483 inhabitants living in Belgrade, out of which there were 2.177 or 6.1% of Jewish population. In the period from 1874 to 1884 a number of Jews in Belgrade (Perić & Stanić, 1992) was increased for 423 or 24.1%, which makes average annual growth of 2.4%. Out of the total number of Jews in Serbia 4160, 2177 of them or 52.3 lived in Belgrade. The census in 1890 shows that there were 54249 inhabitants living in Belgrade, out of which 2729 or 5% were Jews. In the period between the two censuses 1884-1890 the number of Jews in Belgrade was increased for 552 or 25.3% which makes an average annual growth of 4.2%. Out of the total number of Jews in Serbia 4652, 2729 of them or 58.6% lived in Belgrade. According to the census from 1895 there were 59115 inhabitants living in Belgrade, out of which 3097 or 5.2% were Jews. In relation to the previous census from 1890, the number of Jews in Belgrade increased for 368 or 13.5%, which makes an average annual growth of 2.7%. Out of the total number of Jews in Serbia 5102, according to this census, 3097 of them or 60.7% lived in Belgrade. The data on religious beliefs and mother tongue was processed for the first time in Serbia in 1895 census. Out of 3097 Belgrade Jews, 2391 of them (77.2%) spoke Spanish, 527 (17%) German, 120 (3.8%) Serbian, and other Slavonic languages.

On the basis of the data from 1900 census (Perić & Stanić, 1992) we gained more complete demographic data in relation to the previous censuses. According to this census there were 69769 inhabitants living in Belgrade, out of which 3730 of them or 5.3% were Jews. In relation to the 1895 census, the number of Jews increased for 633 or 20.4% which makes an average annual growth of 4.1%. Out of the total number of Jews in Serbia 5729, 3730 or 65.1% of them lived in Belgrade. The literacy rate of Jews in Serbia, according to the census was 68.4% out of which 81.3 were male and 55.3% female. The highest number of the literates was in the age group from 21 to 30, 766 of them (445 male and 321 female) then follows the age group from 31 to 40, 528 of them (341 male and 187 female and finally the age group from 16 to 20, 507 of them (264 male and 243 female). The lowest number of literate Jews is in the group of old population.

Age pyramid of Jewish population in Serbia, according to the census (Perić & Stanić, 1992) from 1900 is of a progressive type because the participation of children is emphasized, which made us conclude that the birth

rate in Jews was very high in that period. The census of population in Kingdom of Serbia conducted in 1905 does not give any data on Jews in Belgrade.

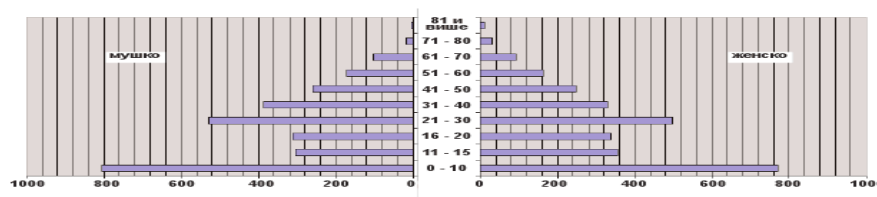


Fig. 3. Age and sex pyramid of Jews in Serbia according to the census in 1900

Census results (Perić & Stanić, 1992) from 1910 show that there were 89.876 inhabitants living in Belgrade, out of which 4.192 or 4.6% were Jews. In the period between the two censuses 1900-1910 number of the Jews in Belgrade increased for 462 or 12,4%, which makes an average annual growth of 1,2%. The most numerous in Belgrade were the Jews from Dorcol part of the city, 3.139 or 74,8%, then in Varos part of the city 555 or 13,2 and Savamala part of the city 103 or 2,4%. In relation to the entire population in the parts of the city, the Jews held a significant percentage only in Dorcol 24.7%. Out of the total number of Jews in Serbia 5.997, 4.192 or 69.9% lived in Belgrade. On the basis of the first census in the Kingdom of Serbs, Croats and Slovenes conducted in 1921, we can observe that there were 111.739 inhabitants in Belgrade, out of which 4.844 or 4.3% were Jews. In comparison to previous census conducted in 1910 the number (Peric & Stanic, 1992) of Jews increased for 652 or 15.5% which is an average annual growth of 1.4%. The number of Jews in Belgrade increased for 652 or 15.5%, which makes an average annual growth of 1.4%. As in the 1910 census, the highest number of Belgrade Jews was of those living in Dorcol 3.171 or 65.4% followed by those living in Town 485 or 10% and Palilula 317 or 6,5%. A significant share in the parts of Belgrade city the Jews had only in Dorcol with 22.8% of the population, in the total number of the Jews in Serbia 11814, Belgrade Jews participated with 4844 or 41%.

The second census in the Kingdom of Yugoslavia was conducted in 1931. According to this census Belgrade had 238.775 inhabitants, out of which 7.906 or 3.3% were Jews. During the period of 1921-1931 the number of Jews in Belgrade increased to 63.2% which makes an annual growth of 6.3%. The census from 1931 presents the data according to their religious practice. In Belgrade, the Sephards were the most numerous ones (77.4%) then followed Ashkenazi (22.3%) and the Orthodox as the least numerous ones (0.3%). Out of the entire number of the Jews in the Kingdom of Yugoslavia according to census from 1931 (68.405), 7.906 of them or 11.5%

lived in Belgrade (Perić & Stanić, 1992). After the bombardment of Belgrade on 6 April in 1941, a fascist occupation of Yugoslavia commenced. That was the beginning of sufferings of people of Yugoslavia, the Serbs and the Jews, in particular. Period of World War One in the area of Belgrade was characterized by many anti-Jewish actions, murders, taking people to camps, taking away Belgrade Jews property. That period was particularly characterized by the sufferings of Jews in Belgrade the collecting camps 'Topovske šupe', 'Banjica' and 'Sajmište'. At the beginning of 1941 there were 12000 Jews living in Belgrade while the outrageous extermination of the Jews in Belgrade was outlived only by several hundred. For this reason, in our opinion, such type of research is important for other historic-demographic studies of Jews not only in Belgrade and Serbia but also for the entire Jewish community in the world.

DISCUSSION AND CONCLUSION

The objectives of this historical-demographic study of Belgrade Jews are manifold. Our aim was to point out to what extent Jewish community with its rich religious and cultural tradition within history of Serbian people has become an inseparable and important part of Belgrade and Serbia. It can be said with right that specific position of Jewish population in Belgrade was of importance for Serbia and that Serbia is one of the rare countries in the world that never had any anti-Jewish movement. That fact clearly shows what characteristics both Serbia (as a developed country) and the Serbs who lived with Jews in harmony for centuries have. Freedom of declaring ethnic belonging to Jewish community has been guaranteed for centuries. Such respect of free feeling of belonging to Jewish people enabled us to realistically study their ethnic structure. That is why Belgrade Jews, who made up the majority of Jewish population in Serbia often used to say that they were Serbs of Moses faith. Complex political circumstances never allowed for Jewish population to develop demographically in a dynamic way. Belgrade Jews community was almost completely destroyed during Holocaust.

During the bombardment of Belgrade in April 1941 a Jewish Dorćol settlement was demolished (Dorćol is a part of Belgrade, on the right bank of the Danube) as well as all the synagogues. Masses of male Jews were shot during September and October in 1941. They were taken from the collecting camp "Topovske šupe". Women and children were exterminated in the camp "Sajmište" in the period from 8 December 1941 to May 1942. A certain number of Jews was killed in camp "Banjica". Belgrade still remembers their sufferings, pains and sighs.

Analysis and comparison of census ethnic and statistical data show that Jewish population in the period of 1717–1941 registered a permanent population growth and increase. Participation of Jews in the total population of Belgrade for this period of time goes from 4.2% to 6.3%. Since 1874 census when Belgrade Jews made up 85.6% of Jewish population in Serbia their share decreased to 11.5% in the 1931 census. The end of the nineteenth and the beginning of twentieth century is characterized by a high birth rate and a relatively young age structure as well as an impressive level of literacy. Most Jewish households in Belgrade consisted of four members. From the data given it can be concluded that the Jews married exclusively among themselves. It is interesting that atypical population variations in Jews from one census to another were not registered.

Thus conducted census statistics of Belgrade Jews in Belgrade provided the data on the entire demographic migrations of Jewish population in Belgrade from 1717 to 1941. However, a successive analysis of Belgrade Jews made it possible to observe and study long term changes in Jewish population in Belgrade. Results of our demographic investigations of mentioned characteristics of Jewish population point to long term changes in demographic development of Jews in Belgrade, which were above all due to the historical, social and economic circumstances in which the demographic development of Jewish population was realized. Yet, this is only a frame of the interior life of Jewish population, which means that a study of material part, of what can be observed: literature, painting, music and culture, what is attainable to people, requires an additional study in order to have a picture of Jews in Belgrade and Serbia completed.

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CVIJIĆ'S STUDY OF METANASTASIC MOVEMENTS WITH SPECIAL REFERENCE TO MIGRATIONS FLOW OF PEOPLES FROM DINARIDES

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ABSTRACT: Studying the Balkan Peninsula Cvijić combined the comprehensive body of knowledge of a number of natural and social sciences to indicate the geographical environment impacts on humans and the environment. Reciprocity of these influences created the specifics of the Balkan area in which intertwined were influences of ancient civilizations and patriarchal society, and these interweaving and mixing created new cultures and types of nations. All this is, of course, a result of continued migrations, which due to the proximity of the areas and predispositions of geographic environment, have been present in this regions from the earliest period, sometimes more, sometimes less intensively, and they are still ongoing. He was the first who marked "metanastasic" and ametanastasic areas, determined migration flows, identified the causes and pointed to the consequences of these movements. In this paper, Cvijić's study of metanastasic movements is discussed, with special emphasis on the Dinarides migration flow, which among others, included emigrants from Montenegro. The paper also analyzes the causes of metanastasic movements, starting with historical, psychological and moral reasons, all the way to the economic ones, that are most common, and their numerous consequences that Cvijić comprehensively studied and which are still present in the Balkans.

Key words: metanastasic movements, migrations, Jovan Cvijić

INTRODUCTION

Jovan Cvijić, together with his associates, started a comprehensive research of the population (cultural belts, psychological characteristics, types, settlements and migrations) of the Balkan Peninsula in 1896 and

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the Academy of Sciences started to publish them from 1902, in the book "Villages" (until 1927). Thanks to that, Balkan Peninsula has become one of the most researched areas in the world from anthropogeographic aspect. As he himself mentioned in the paper "Anthropogeographical problems of the Balkan peninsula" that "after long hours of work and thinking" he noticed significant anthropogeographical problems so he became more and more "caught by thought that in the first place settlements should be systematically examined, which are in relation to physical geography and after that other anthropogeographical and some ethnographic objects" (Cvijić, 1987; 19). To accomplish this "Guidelines for testing of villages in Serbia and other Serbian countries" were created in 1896, which later were expanded, depending on the needs, specifically those were written separately for some of the countries.

Migrations - metanastasic movements, Cvijić elaborated in details in the "Balkan Peninsula", which represents a synthesis of all researches of Cvijic (first published in 1918), although on migrations, the causes, methods and consequences he wrote in other papers as well such as "About Eviction of the Bosnian Mohammedans" (published in the Literary Gazette in 1910) "Distribution of the Balkan Peoples" (published in the Gazette of Serbian Geographical Society in 1913); "Migrations and Ethnic Processes in our Nation" (printed in Sarajevo in 1922), lecture held at the National Assembly in Belgrade during the erection of the Monument to the Unknown Soldier, "The Northern Border of South Slavs" (paper for the Paris Conference in 1919), "Metanastasic movements, its causes and effects" (The Serbian Ethnographic Anthology, 1922) as well as in other anthropogeographic and ethnographic writings. These are also the first detailed studies of migrations in this region, which were conducted thanks to many years of Jovan Cvijić's and his associates' work in this area.

The basic method for research of migrations was fieldwork. As Cvijić himself stated, some migrations were known from historical sources whose data were valuable, but those were mostly mass migrations outside the borders of the Balkan Peninsula, on the basis of which one could not acquire ideas on migrations in this region during the Ottoman rule and later time. For this reason, he stated "After all, only through the study on the spot it is possible to get to know: whether there are now present those immigrants; their layout in the villages; in which population they entered; what changes have taken place in them; that ethnic and social impact on old people and older immigrants. In this regard the population on the spot should be examined, from village to village, from house to house in all of our countries, and got information should be verifiabed from all aspects"(Cvijić, 1987; 128).

METANASTASIC MOVEMENTS

By studying the migrations, Cvijić noted that starting from the 14th to the early 20th century almost the entire population from Gorge of Veles to the Mount of Zagreb was “jumbled” and that the main mass of migrant population was population of Dinarides. This resulted in a change in distribution of the population on the Balkan Peninsula, as well as the population of its individual parts – some were losing population, others got, the interference of the population were presented, which in the final resulted in disappearance of the old historic medieval Serbian people and the formation of a new ethnic amalgam (Cvijić, 1987).

To examine in more details and to separate population movements and highlight their character and significance, Cvijić called them metanastasic movements¹. These movements had not usually been directed from the mother country to the country of colonization, but those sometimes for many years were held in the so-called transitional country. Thus, as an example, he stated that the immigrants from Montenegrin hills were lingering around Sjenica, Pešter and Stari Vlah, and later they moved toward Šumadija and valley of Morava river. There were so-called longitudinal and transversal directions of metanastasic movements, the transversal, as he stated, had been more important. Areas with a high intensity of migration flows and mixing of the population he called metanastasic, and those in which there was coming a little of population and where mainly local movements took place, he called ametanastasic in which he ranked area of Šopska, Kajkavian Croatia, Slovenian countries and southern Macedonia. The most important metanastasic areas, that due to mass immigration had a small percentage of indigenous population were area of Serbia near Morava, Dalmatia and Srem, then Banat, Bačka and Baranja. He also emphasizes that in this metanastasic area, which stretched from the Gorge of Veles to Zagreb, there was a part of the population that was less movable. These were the Muslims of Bosnia and Herzegovina, of Sandžak of Novi Pazar to Rogozna Mountain (Cvijić, 1987).

In the western and central regions of the Balkan Peninsula Jovan Cvijić singled out four groups of metanastasic directions: the dinar, which was the strongest, Kosovo-Metohija flow, Vardar-Morava or southern flow and flows that crossed the Sava and Dunav rivers. Flow of Kosovo was made of migrants from the area of Skadar to Kopaonik including areas: Zeta, Metohija Prizren and Kosovo. Vardar-Moravian flow was made up of emi-

1 Metanastasic movements are gradual and long-term movements of population that were characteristic for the Serbians in the Balkan peninsula in the period of Turkish rule.

grants of Vardar basin north of Demir Kapija and western Macedonia from the vicinity of Prilep. This flow, unlike the previous ones was not massive, through it mostly emigrated families or small groups. Kosovo and Vardar flows were formed of the population of area of Serbia near Morava of new very strong flow that crossed Sava and Dunav and populated the Basin of Panon and Erdelj. Apart from this, as a result of the Turkish penetration to the north, dinar flow was formed that also crossed Sava and Dunav, but not over Serbia, instead the immigrants from Bosnia, Herzegovina, part of Raška and Montenegro went to Slavonia, Bačka, Baranja, Styria, Carniola and Croatia (Cvijić, 1987).

Mainstream of dinar flows were areas of Herzegovina, Montenegro with the highlands, Montenegrin Herzegovina, Sjenica and Pešter with the regions of Novi Pazar, in broader terms those were the areas of the former Raška and Zeta. Population moved through transverse roads through metanastasic folds and passes: Mokra Gora, Kokin Brod, Javor, Raška, the valley of the Drina River, settling Podrinske regions and Valjevo especially Šumadija. At that time Šumadija was sparsely populated, system of citluk in it was not significantly prevalent, and most farmers were free what looked like an attractive factor for the population. Population of flow of Dinarides was mostly coming from the mountain infertile and dry areas, so the fact that at that time Šumadija was under forests that should have been stubbed had not significantly affected the intensity of immigration, on the contrary, when at the beginning of the 19th century it was liberated from the Turkish rule, it "attracted almost all professions of the continental bloc" (Cvijić, 1987, 130). On the other hand, the Morava Valley, which was a wetland and forest area, attracted migrants of flow of Dinaridi, so they settled in the valleys of the eastern part of Serbia between Morava and Timok. There were settling by the intervention of the State. Cvijic stated that in the last decades of the 19th century the government settled Montenegrin immigrants in the valley of Toplica, Pusta Reka, Jablanica and environment of Leskovac, after these areas areas were depopulated.

Apart from this there was another flow of Dinarides that from Montenegro, Herzegovina and Old Raška went to the north to Bosnia, valleys of Piva and Drina River to Glasinac, upper Podrinje, Tuzla, Posavina to Brčko. The most numerous in this stream were Herzegovinian immigrants who massively settled in the vicinity of Sarajevo, central Bosnia and Bosanska Krajina where they merged with immigrants from karst fields of western Bosnia.

Significant migration flows from Montenegro, Bosnia and Herzegovina went towards Dalmatia. Almost all inhabitants of the Bay of Kotor

originates from Montenegrin and Herzegovinian immigrants, then the population of the environment of Dubrovnik is mostly of Bosnia and Herzegovina origin. Cvijić states that a large part of the population of the city of Dubrovnik was then of Herzegovinian origin as well as the population of Makarska, Omiš, Split and Šibenik, while for the population of Bukovica and Ravni Kotar in Dalmatia it was claimed that they are "almost exclusively" of Bosnia and Herzegovina origin (Cvijić, 1987, 130).

First migrations of flow of Dinarides to Croatia (Žumberak) and Slovenia (they came to Maribor and Ljubljana) have moved from western Bosnia (Glamoč, Unič) and Dalmatia. As stated above, these migration flows largely moved by transverse flows, but in the flow of Dinarides in intensity existed much weaker, longitudinal flows of movements from Bosnia, others through Žljeb above Rožaje and third through the valley of Bistrica of Pec towards Kosovo and Metohija. In Metohija these immigrants represented the majority of population, and they were numerous on Kosovo, especially around the Lab.

CAUSES OF METANASTASIC MOVEMENTS

Studying the causes of metanastasic movements, Jovan Cvijić stated that they are different and usually intertwined, although in most of the cases there was a major one who was a driving force. The most common cause of mass migrations of population was sheltering from the invasion of the Turkish army. In addition to this one, various rebellions were many times the reasons for the mass escape of the people from reprisal. In addition to these causes, intermingled were moral and psychological motives, because people with a strong national consciousness could not be reconciled with oppression, economic insecurity and poverty. What was the decisive factor, or "trigger" for launching of population Cvijić estimated on the basis of mass migration. He stated that the invasions of conquerors, as a rule, initiated mass migrations, while migrations because of economic reasons were less intensive, but constant over time and they were responsible for the changes in the ethnic composition of the combination of population. Besides these, migration of population also launched attractive factors such as better economic or safer political circumstances in the countries where the population was going. Also, as one of the causes of movements of population, there was the habit of people to move.

Causes that launched masses of population on migrations Cvijić classified in the historical and psychological and economic. In historical he classified migrations caused by the Turkish invasion, due to which the

population moved to upper grounds and went back to a lower when the danger passed. After the Battle of Kosovo and Marica, the capital of Serbia was relocated first in Belgrade and then in Smederevo (Ćorović, 2004, 278, 302), while the population at the same time was massively moving to the north which was sparsely populated. After the fall of Smederevo and Serbia under Turkish rule (Ćorović, 2004, 332) the population massively moved to Srem and countries of Dinarides, mainly to Bosnia, much less in Banat, Backa, Baranja and Slavonia. As the historical causes of population migration Cvijić stated the practice that was introduced by Turkish invaders, by people known as "devşirme" that included every four years taking away of biggest and healthiest children for the formation of their elite military squads - the Janissaries.

To protect their children and families inhabitants every fourth year, massively migrated in high mountain areas or in neighboring countries of Austria (Cvijić, 1987). Mass migrations were caused by various uprisings and rebellions against the Turkish government, wars of national liberation and wars of Austria against Turkey in which the Serbs took part on the Austrian side and after leaving Austria from the war it had to flee from the wars of reprisal. In the historical causes of migrations of population Cvijić also states hordes of krdžalija, mainly composed of the Albanians, who robbed and mistreated residents who were forced to take refuge. There were also migrations caused by religious persecution; Cvijić states the Bosnian Bogomils as a typical example.

Another group of causes, economic one, provoked by volume, less but by duration almost constant migrations and therefore more significant when the consequences are concerned. Essential to this migrations is that the population goes from economically underdeveloped to economically richer regions. Migrations with economic causes have taken place between karst and mountainous areas of the system of Dinarides and Šumadija, northern Bosnia, Srem, Banat and Bačka. For centuries, from the territory of Montenegro, Raška and Herzegovina river of migrants were flowing towards these areas. As Cvijić stated "in regions of karst there is little arable land, and population growth is big. Even in normal years, there is a discrepancy between the sources for life and the number of population. The same thing is presented in high mountains of the system of Dinarides. In order to nourish and sustain the population on karst and mountainous countries, the second part must emigrate. There are, therefore, the conditions for a natural and permanent migration" (Cvijić, 1987, 148). In addition to population growth, climatic fluctuations in karstic regions which manifested itself in severe droughts or very cold winters, were the causes

of migration. Cvijić through the investigating of the causes of migrations found that in addition to economic reasons, migrations were affected by moral and psychological motives, pride and sensitivity of a man of Dinarides and he documented it with a number of examples. He stated that in the Montenegrin areas often tribal fightings were the causes of emigrations for weaker and suppressed tribes.

In the areas under Turkish rule the cause of migrations was serf regime - in deserted areas from which people fled from the Turkish regime, the Turks would inhabit by serfs from areas they earlier had won to help them cultivate the land.

In addition to permanent there were temporary migrations, which represented mainly seasonal movements of livestock breeders and construction workers.

THE CONSEQUENCES OF MIGRATIONS

Analyzing the effects of migrations, Jovan Cvijić gave a psychological profile of migrants stating that "there is something inside, in themselves, which changes them and makes them move; in an immigrant before a migration there is a greatly changed the internal organ that creates and abates. In the moment when it is mature for migration it is the already mature for evolution" (Cvijić, 1987, 154). So, changes are inevitable, and their intensity and rapidity depend on the environmental conditions in which one came, the number of inhabitant and immigrant population, the way one was received in the new environment and so on.

The changes that have occurred in immigrants Cvijić divided into three groups: the adaptation of new natural or geographical conditions, ethnic and social adaptation and changes that occur due to ethnobiological processes. Immigrants of migration flows of Dinarides were mainly cattle breeders from high mountain areas, which had to adapt in the new environment on agriculture and customize to a significantly lower altitude and different climatic conditions. Easier were adapted immigrants that retained in the so-called staged countries, because only the second generation of these migrants would be adapted and moved into lower-lying areas, as well as those who came in larger groups. During the choice of settlement, people from Dinarides would rather choose carst and hilly areas than plains. In the new settled areas they would often give names to settlements and other toponyms according to the names of home areas.

Social and ethnic adaptation has not been easy, the immigrants had to adapt to "old inhabitants", by whom they were not easily accepted, and

by whom they were not considered as equals for a long time. In some cases, if they were not able to adapt they moved to other areas. Marriages between natives and immigrants of the first generation were a real rarity, but in other generations those were more common. Cvijić stated that for the adjustment to the new environment more favorable was population of Montenegrin Mountains and Herzegovina, and the most resistant population was population of old Montenegro, Katunska, Rijeka, Lješanska nahija and Crmnica. They have difficulty to give up cattle breeding way of life and their folklore, although there were also opposite examples. Such was the population of medium altitudes or from nearby shopping centers and roads, Herzegovinian population from the vicinity of Trebinje which could be easily assimilated. "While immigrants do not adapt, others laugh at their habits; their way of work and their behavior gives rise to ridicule and they often got nicknames that mark their features" (Cvijić, 1987, 160) - this quote best shows how painstaking was the process of adapting of migrants.

Ethnobiological processes are the result of crossing marriages between native and immigrant population and immigrants from different parts of each other. The crossings took place in the whole metanastasic area, particularly in Serbia, Slavonia and Dalmatia. In the first generation there was a little crossing, but in each following there was more and more and it resulted in the creation of a new physical and psychological type. Depending on the participation of certain flows in various areas formed were different regional types of population. These ethnobiological processes mostly took place within the same religion, although there were instances of interference. In this way, an entirely new type of population was created that differs from native population and the population of the home country the settlers were from.

Thus, the consequences of migration were numerous, from new habits among the people, customs, folklore, expansion of individual dialects and suppression of others. The blending of peoples created close ties between the Serb people in various parts of the Balkan Peninsula, interfered were Croats and Slovenes, which contributed significantly to the creation of a common state of the South Slavs after the First World War.

INSTEAD OF CONCLUSION

Migration flow of Dinarides, which was firstly in details studied by Jovan Cvijić, flowed, sometimes more, sometimes less intensively between the two World Wars and later throughout the whole 20th century, and it still flows today. In the period between the two World Wars migrations to

overseas countries were strengthened (North and South America), which somewhat reduced the intensity of the flow of Dinarides towards Serbia. Although there were no precise records of internal migrations in the Kingdom of Yugoslavia, on the basis of the movement of natural growth and the increase of population in Montenegro, it was noted that in the period between the First and Second World War emigrated 36 000 persons. Many of them by economic and social policy were directed towards Kosovo and Metohija. After the Second World War in the period 1946–1948 about 38 000 of people had emigrated to Vojvodina (Radojičić, 2002, 153). On the territory of Bosnia and Herzegovina there were also presented migrations during the Second World War –through the planned emigration conducted by the former Independent State of Croatia expelled were about 400 000 Serbs in Serbia. In the period 1945–1948 in Vojvodina emigrated about 90 000 inhabitants. In the former Yugoslavia, internal migrations, in addition to the so-called “rural exodus” (which took place from rural to urban areas within the municipality or municipalities in the same republic), generally had direction underdeveloped - developed republics, so population from Montenegro, which belonged to the category of underdeveloped republics, constantly emigrated, mostly to Serbia, less to Bosnia and Herzegovina, Croatia and Slovenia. At the same time the external migrations strengthened (towards the countries of Western and Central Europe and, to a much lesser extent towards overseas countries). In the period from 1948 to 1981 from Bosnia and Herzegovina emigrated 548,958 people (towards the countries of Western and Central Europe or to overseas countries). Out of the republics of former Yugoslavia for migrants most attractive was Serbia, where directed were about 48.6% of migrants (Marijanac, 2000; 155).

The disintegration of the former Yugoslavia has launched the most massive migrations to the area of the Balkan Peninsula - the migrations of refugees, who mostly found shelters in the former Yugoslavia, i.e. its republics of Serbia and Montenegro, where in 1991 there were a total of 646,066 refugees from Bosnia and Herzegovina and Croatia, out of which 617,728 were in Serbia and 28 338 in Montenegro (*“Census of Refugees”*, 1996; 123).

As Cvijić in the Balkan peninsula highlighted, in the area of Dinaridi, there are conditions for permanent migration due to poor pedological and hydrological conditions, which was the main reason for the economic migrations which have never ceased, but only changed the intensity depending on the economic and political conditions in the countries of final destination. In addition to the economic, as was the case in the time that was studied by Cvijić, presented were other causes such as psychological, social or war in the former republics of Yugoslavia.

Migrations of the flow of Dinarides between the two World Wars in the Kingdom of Yugoslavia, which were largely due to planing orientated from agrarian overcrowded and economically underdeveloped areas to sparsely populated areas with much better economic potentials, have had positive effects for the areas of origin and areas of destination of migrations. Migrations in the former Yugoslavia were mostly with economic causes, and in contrast to the period studied by Jovan Cvijić, when the final destinations of migrants were areas with fertile land, destinations for migrants were urban centers with developed industry, and above all Belgrade as the capital of former country and the capitals of republics and provinces. For this reason, these migrations, in addition to the consequences that Cvijić stated (ethnic mixing, customs, folklore... etc.) resulted in the depopulation of rural areas and uneven regional distribution of the population. In the former state, there were two poles - emigration areas (undeveloped republics - Montenegro, Macedonia and Bosnia-Herzegovina) and immigration areas (developed republics of Serbia, Croatia and Slovenia), and the effects of migration differently manifested in them. In the immigration areas the number of population was increased, surplus labor appeared, overpopulation and rings of paraurbanisation in cities. On the other side, in emigration areas due to outflow of working and reproductively most competent population, especially in rural areas, the aging process was accelerated, destitution appeared, the feminization and senilization of the labor force in rural areas.

Cvijić studies of migrations on the Balkan Peninsula are priceless significant not only because he first studied them and determined metastatic and ametanastatic areas, flows and directions, or because by his instructions for studying of the settlements methodological basis for social geography was founded, but, as the respected professor Vasović said "it is much more important that he first comprehensively studied this unique anthropogeographically complex ranging from deep economic, historical, natural and psychological causes, to almost innumerable consequences of which mingling of people remained crucial and fateful characteristic.

It is exactly this mingling on which Cvijić based upon a deep conviction about the necessity of coexistence of different peoples in the same geographical areas". Also, it is much more important that the results of his studies in all fields, in particular migrations are current today, after more than a century.

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CONTRIBUTION OF JEVTO DEDIJER AND VOJISLAV RADOVANOVIĆ TO DEVELOPMENT OF SERBIAN ANTHROPOGEOGRAPHICAL SCHOOL OF JOVAN CVIJIĆ

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ABSTRACT: Jovan Cvijić chose Jevto Dedijer for the first docent (associate professor) of geography and entrusted him to teach and develop anthropogeography. After Dedijer's early death Cvijić chose Vojislav Radovanović to continue with his work. The way Cvijić guided young talented students is very visible from the letters that Jevto Dedijer sent to him, and Cvijić carefully preserved all 45 of them. Anthropogeographical researches of Dedijer rely on the trusted "Cvijić's method", which was based on folk tradition, the origin of baptismal names, ethnographic motifs and characteristic buildings in certain areas. They applied a general approach which consists of field research and the genetic code that allowed them to study evolution of the people, the culture of the population, settlements and territories. In research on the origin of the population, Dedijer used this methodology in the studies of Herzegovina and Macedonia. As Cvijić's best pupils Jevto Dedijer and Vojislav Radovanović gave an important contribution to the development of the Serbian anthropogeography and they deserve to be mentioned on the occasion of homage to the great pioneer of the Serbian geographical thought. Jovan Cvijić taught both of them, but Jevto Dedijer was teaching Vojislav Radovanović too. Dedijer participated in the WWI, crossed Albania as a member of the Serbian army. Both of them consistently continued and significantly improved Cvijić's anthropogeographical work. The Cvijić–Dedijer–Radovanović axis is the backbone of the Serbian anthropogeographical school.

Key words: anthropogeography, J. Cvijić, J. Dedijer, V. Radovanović, E. Oberhümer

INTRODUCTION

As Cvijić's best pupils Jevto Dedijer and Vojislav Radovanović gave an important contribution to development of Serbian anthropogeography and

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they deserve to be mentioned on the occasion of remembrance of the great thinker of Serbian geographical thought. Jovan Cvijić taught both of them. Dedijer were participants of WWI and Albania as a member of Serbian army. He died of Spanish fever in Sarajevo in 1918. And he is one of three victims of great war od University of Belgrade. Both of them consistently continued and significantly improved Cvijić's anthropogeographical work. Cvijić has chosen Dedijer for first docent of geography and entrusted him anthropogeography section.¹ After Dedijer's early death, Cvijić entrusted anthropogeography to Radovanović. Dedijer was vividly describing landscapes, reaching essays, but without neglecting scientific character of work.

SERBIAN ANTHROPOGEOGRAPHICAL SCHOOL

Serbian anthropogeographical school was founded by Jovan Cvijić. At first he wrote about areas of Balkan countries (Cvijić, 1903), then he published *Uputstva za proučavanje sela u Srbiji* (1896) and *Uputstva za proučavanje sela u Bosni i Hercegovini* (1898). Then they started the first organised scientific research of settlement and population of South Slavic countries. The results of these researches have been published from 1902 with the series of book under the title "Naselja srpskih zemalja", and from 1922 under the altered title "Naselja i poreklo stanovništva". Often it was a monography on the areas that represent the most valuable creativity of Serbian anthropogeographically school.²

Commission to exploration of the rural villages was educated at the XI Congress of the International Geographical Union in 1925. Under Cvijić's supervision there were processed geographic, demographic, historical and economic researches of the population and settlements, and then published in the edition „Naselja srpskih zemalja". By then there were

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- 1 Anthropogeography (Greek anthropos - man and geography), science that examines relationship between natural environment and a man, question of of geographical settlement of people, cultural and agricultural features. Founder is German scientist Fridrich Ratzel. From classical anthropogeography we have geographical disciplines like: geography of population, resorts, economic geography, political geography etc. (According to: N. Mastilo, Rečnik savremene geografske terminologije, p. 21).
 - 2 Serbian anthropogeographically school - by the side of Dedijer and Radovanović, we have to mention R.T. Nikolić, S. Tomić, T. Radivojević and B. Ž. Milojević. Important contribution to development of this school gave anthropogeographers and ethnographers J. Erdeljanović, T. Đorđević, M. Filipović, M. Lutovac and J. Trufunoski. On development, and preservation of scientific dignity and tradition of this school important people are M.V. Radovanović, S. Stamenković and M. Grčić. In BiH researchers were O.Kozić-Đurić, S. Trifković, P. Rađenović, M. Karanović, P. Šobajić, T. Kanaet, M. Bjelovitić and Z. Marijanac.

published ten monographs on settlements and origins of population.

Anthropogeographical researches of Dedijer rely on trusted “Cvijićev method”, which was based on folk tradition, the origin of baptismal names, ethnographic motifs and characteristic buildings in certain areas. They applied a general approach which consists of field research and the genetic code that allowed them study the evolution of the people, the culture of the population, settlements and territories. In researching on the origin of the population, this methodology Dedijer used in researching Herzegovina and Macedonia.

REVIEW OF DEDIJER'S ANTHROPOGEOGRAPHICAL RESEARCH

Jovan Cvijić has passed Herzegovina in 1892 to study the karst phenomena and then he found one twelve-year-old boy who was his left a very good impression. It was Jevto Dedijer, who was accepted by Cvijić who introduced him into the secrets of geographic science. Cvijić enrolled Dedijer in Mostar comprehensive school and then to study geography and history at the Faculty of Philosophy in Belgrade. After three years he was enrolled at the Faculty of Philosophy in Vienna, where he received his doctorate in 1907. At the end of life, war circumstances led Dedijer to Paris, and in Neuchâtel and Geneva. Dedijer was a versatile geographer who has acquired a geographic education in Cvijića, and then it spread in the Viennese professor A. Penk, E. Oberhaumer, K. Jireček, E. Brikner, A. Grund and so he met Viennese geographic school Vidal de la Blache. In this paper, we paid attention to correspondence between Cvijić and Dedijer because it is important for understanding their scientific and public work. The letters preserved by Cvijić, are a valuable complement to the available strict historical facts. Collection of stored letters shows us an interesting life and creative angle of Cvijić and his relationship to talented and ambitious students as it was case with Dedijer. Letters are living testimonies of Cvijić's goodness, Dedijer's path of life, people with whom he met and collaborated, wars, adversities, research activities and everyday problems in life and work, friendships and human collaboration and publishing and public operation of our scientific workers were employed on the arrests of researchers by Austrian authorities. If there were no this written correspondence it would be difficult to understand the time and the events in which these people lived and worked.

When a student of the sixth class of Mostar comprehensive school Jevto Dedijer read *Uputstva ...* by Cvijić published in *Srpski Vijesnik* (1898) he immediately sent a letter to Cvijić 19. X 1898, offering him a text of his own country.



Fig. 1. Jevto Dedijer (1879–1918)
– Archives of Serbian Academy of
Sciences and Arts SASA.

/Dear Sir/

'Serbian Gazette' in one of its recent issues presented the 'guidelines for the study of villages in Bosnia and Herzegovina'... you're looking for to describe certain places in Bosnia and Herzegovina ... but when I heard that all these works go through you, I decided to send you one of my attempts in describing the place where I first saw the world ...

Cvijić needed young and hardworking associates. Dedijer was 18 years old and did not hide his satisfaction when on the final list of Dedijer's letter he saw Cvijić's answer in just six days: *Young friend. Compliments patriots. The hero we search for. You will be paid for the trip. Put there your real name. Spread 'Guidelines' as more as you can and win the aforementioned young men for the job. The report shows the name of the populati* (Archives SASA, 13484/304–1).

So Dedijer began exploratory trip where he gained the favor of Cvijić: *your esteemed letter of 25. X 1898. made me very pleased. How I rejoiced, that you find that my description of Zadublja village is worth - the more I was glad I found in you a scholarly and a good friend* (Arhives SASA 13484/304–2).

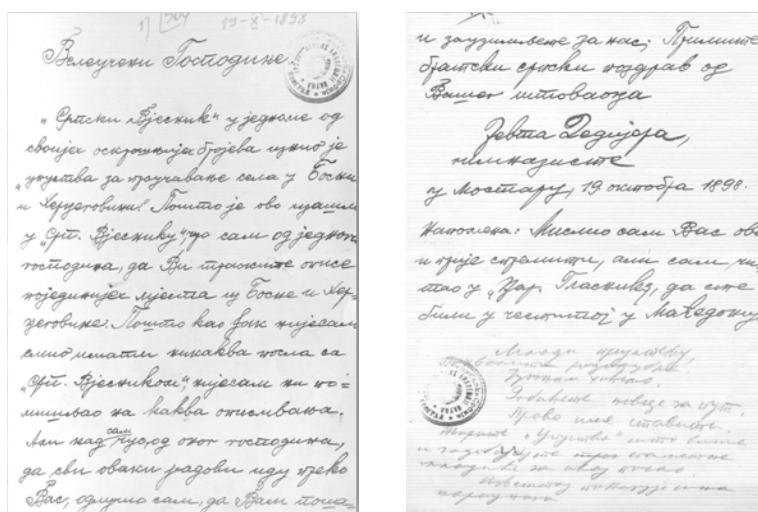


Fig. 2. The first Dedijer's letter send to Cvijić, 19th October 1898 and written response by Cvijić/ Archive of the SASA

By the emergence of Dedijer priests, teachers, and more knowledgeable people in the literary milieus were dealing with it. Dedijer studied anthropogeographically processes on the basis of family, kinship and tribal traditions, migratory currents, livestock movement, describing their habits, preferences, and in particular their soul. So dedicated to his country and

his people, from early childhood until the end of life. Dedijer was performing field tests, conquering Herzegovina, step by step, collecting materials that was duly sent Cvijić, asking him for his opinion and new tasks.

Dedijer in 1898, began to question the villages around Mostar. On the court, he went with his classmates Tamindžić and Vujević, and at one time they were joined by Đ. Pejanović. In Mostar, he lived with Atanasije Šola, cultural activist and politician, one of the greatest intellectuals of the time. Visiting Herzegovinian villages, Dedijer was often encountered with unexpected problems. Authorities in Ljubuški in 1899 forbade him any movement. In May 1908 in Popovo Polje he was arrested with J. Cvijić and B. Ž. Milojević. They were conducted in a prison in Trebinje, where they were stripped of gathered material. Dedijer was accompanied by order of the Provincial Government when researching the Bosnian Krajina in 1912. In order to hide his tracks Dedijer in his letters to Cvijić 1990 signed himself under the pseudonym Gojnik Stojimirović.

Dear Sir

I received your last letter to me asking me to send you descriptions of the village ... the next day I go to the village Drečevica close Gnojnica so I'll go through the village Gnojnice...and about village Ravčići what might be known it is tested, and I think Repiješ is fairly tested ... and now, to introduce you to my associates. Vladeta Vojvodić is the pseudonym Rista Toholj. He is also gimnazist, the young man of undoubted honesty, diligent and good and enthusiastic Serb. Milan Smiljanic is Risto Miličević, same gimnazista. What I have said for the first colleague I can say for the other too. Several classmates went to Nevesinje, to work on this job ... We will work in the villages around Mostar ... for what we should borrow money because we can be trusted for that amount of money.

More please contact us in the letters you send them via mister Šola addressing us only by pseudonyms because they would open the letters at the post office. Everything from Serbia and Montenegro raises suspicion.

Gojnik Strojimirović and his friends (Archives SASA, 13484/304–1).

Going to study geography and history in Belgrade, Dedijer expanded geographical knowledge and he used summer vacation to do anthropogeographical research, of as he says "my country" (Dedijer 1907), Dedijer from its Collection (1898–1903), in the edition Resorts Serbian countries printed book Bilećke turfs (1903). It was the first work of BiH which is printed in this edition. Professional assessment of it was made by J. Erdeljanović (1904) - *This is very interesting area that has its descriptor very thoroughly and properly studied. Nice emphasized the importance of land in the north wind and*

hydrographic conditions on the location and types of settlements. Of particular value is the section on economic conditions (Dedijer, 1914).

The report Dedijer shows us his scientific commitment:

The main area of my independent work was Physical geography and anthropogeography. A major scientific issue on which I have worked so far to examine the relationship between the nature of the land and the life of the Serbian people. In this regard, I particularly questioned the western Serbian lands, Herzegovina, Dalmatia, Bosnia ... while traveling ... I had to master huge obstacles by the Austro-Hungarian authorities. It was one of the main reasons why these tests have not been completed yet (Dedijer, 1914).

Dedijer's research in the fields of glaciology were pioneering. Glaciation of the Balkans is a popular scientific question from the beginning of the 20th century reserved for scientific authorities as they were Jovan Cvijić and Viennese professors in charge of managing of Albrecht Penck whom Cvijić considered scientific authority of geomorphology. Dedijer as a student appeared with the first work in glaciology, just three years later. He wrote five works from glaciology. However, in a discussion of glaciation Dedijer as a student walked into a nasty conflict with his mentor, Alfred Grund. There existed a risk that, because of serious disagreements, Dedijer leave the doctoral studies. Cvijić had rebuked him during field tests in Donji Milanovac (1905) and ordered him not to write any work of glaciation for a period of five years. Dedijer adhered Cvijić's request and only in 1909 published a paper on glaciation mountains Visočica.

I recorded something from physical geography and it seems to me that in the valley of Rama and Neretva I have noticed important points ... but these things I can not write about because you ordered me in D. Milanovac that these things do not occur, at least for five years (Arhives SANU 13484/304–15, letter from Dedijer to Cvijić, 30.V 905).

Cvijić has changed a mentor to Dedijer. At first he was directed to Penck, and then to Oberhumer and Brückner. Reconciling it with Grund, Cvijić sent him to anthropogeographical research of Herzegovina. Cvijić believed that Dedijer has to do anthropogeographical studied of Herzegovina, and then Bosnia, so that in the event of serious political upheaval could go to a peace conference with the arguments for future anthropogeographically status. Until then, Europe was full of tendentious propaganda articles on the Balkans. At that time more was known about the deserts of Africa than of Bosnia and Herzegovina. However, Europe has recognized

the rigorous science data. Anthropogeography has contributed a lot to learning about our country in Europe. Thus was born anthropogeographical study - Herzegovina, and Dedijer became a prominent anthropologist. Scientific work of Dedijer in the field of physical sciences remained overshadowed by extraordinary anthropogeographically studies *Herzegovina*.

Herzegovina - anthropogeographical study (1909) is the most important work and crown of Dedijer's ten years of work. At the session of the Serbian Royal Academy J. Cvijić put forward a positive opinion and recommended that the study *Herzegovina* should be printed in the edition *Settlements* as a separate offense. Showing Dedijer's study, published in the Serbian Literary Gazette and initialed "N" in which they expressed Cvijić's opinion:

The scientific value of this monograph of an entire Serbian country, whose ethnic importance is of extremely great importance, it is best judged and most competent by Jovan Cvijić among the others invitees... Huge material, whose value will eventually be increasing for the first time ipitana is anthropogeographically an entire country. Work method is reliable and excellent. Work is just important because Dedijer analyzed creative moments, morphological, cultural and psychological, and explained to them the settlements and human life. in this respect his work better than those who have been published in "settlements". Through the great debate led feels and beats the energy of work and thought, this is a sign that we can expect from Dedijer more important works.³

With the study *Herzegovina* Dedijer laid the corner-stone in the Serbian human geography. His scientific works are positively featured by professors from famous universities of Europe - Wilchem Gotz (Munich) in Petermanns Mitteilungen, Gaston Gravier (Paris) in *Annals de Geographie*, Jirzi Polivka (Prague), Jovan Cvijić and Jovan Erdeljanović in our journals. Insert of Dedijer's letter to Cvijić says about the origin of this studies:

In the work on human geography of Herzegovina ...it would be inconvenient to separate part of the overwhelming materia... Such work would be too big... so that in the work on Herzegovina I was thinking to put only the results of these smaller works, and that at the end of printed edition I insert only descriptions of those villages ... I have a letter that I wrote to you last fall from Rudina where I have not been able to let the main results of my tests ... I can assure you that I have worked intensively, that I have visited most of Herzegovina and that I did a good observation. When you receive my paper on Etn. Characteristics and the Livestock will be able to see yourself and the easiest will be to convince yourself. Although

3 Literary gazzete, XXIII, no 4, 16.august, Belgrade, 1909, 396–397.

I have been working long on introducing national soul now I just saw that I am not able to understand you; While I was at the High School ... (13484/304–16, Vienna, IX. Broschkegan 15th, 16th, 21st November 1905).

Anthropogeographically appearance of Herzegovina Dedijer explained taking into account the physical-geographic factors (climate, relief with altitude, hydrography and biogeography), which influenced the life of the population, location and appearance of the settlement, migration and the economic activities (Dedijer, 1909). In determining the types of villages Dedijer relied on proven Cvijić's anthropogeographical cycle "Anthropogenic cycle in the evolution of rural types must karst shrivel immediately at its beginning." Dedijer left a priceless record of the scheme on the types of Herzegovinian village and borough house. He described each village, its origin, type, origin population and economy. Dedijer paid attention to migration. Made by the Stock overview in the valley of the river Neretva, following emigration from BiH in Dalmatia, Bosnia, Croatia and Slavonia. It is a pioneering culturological and ethnographic research of Herzegovina, which included analysis of over five thousand families and it is a kind of migration catalog (Dedijer, 1909). Scientific settings of Dedijer is impossible to bypass the geographic, ethnographic, historical, psychological, sociological and other studies. Everything that, after Dedijer, was burned and wiped off the face of the earth, thanks to the study Herzegovina, can be faithfully reconstructed.

Cattle movements in Herzegovina - anthropogeographical study (Dedijer, 1907) was the subject of a doctoral dissertation by Dedijer defended at the University of Vienna. The mentors were E. Oberhumer and E. Brikner. Following cattle movements in Herzegovina, Dedijer is modeled on de Martone research in the Carpathians and the Alps that followed life of livestock area of the mountain Dinarides. It had served him to put an original scientific idea, based on an analogy related to geographic areas and similar phenomena and he writes about it to Cvijić:

By reading various books about France, I saw that related geographic objects anthropogeographically cause similar effects. If I had a year of time it seems to me that I could find analogies between people very distant, like for example the Bosnian Muslims and Spanish ranchers ... article by de Martonne of livestock life in the Carpathian Mountains in the 'Zu Fr. Ratzels Gedachtun' is interesting ... there are a lot of similar things with Herzegovinians. I get more and more interested in anthropogeography (SASA 13484/304–26, Dedijer's letter to Cvijić from Sarajevo 22nd September 1907).

Dinarides and Carpathians are similar in nature, way of life and economic activity of the population. This was the decisive moment in Dedijer's scientific interests since the most important area of his research will be anthropogeography. Works of E. de Martone on livestock movements, became a central scientific-research field of Dedijer. He knew that the seasonal movement of livestock in search of food, were driven by population and it is presented in the thesis (Dedijer, 1907). The results of the research he tells to Cvijić:

The problem of our muslims attracts me more ... I was surprised with the name Srbljak, which they used as a synonym for the mountaineer, who does not go with livestock outside their districts. It is anthropogeographically term for a man who lives at high altitudes. Srbljak is contrary to the name Humnjak (SASA 13484/304-26, Dedijer's letter to Cvijić from Sarajevo 22nd September 1907).

It was a complex report in which Dedijer opens a series of original anthropogeographic problems. interesting phenomena are the country walkers - bey estates which the peasants bought, processed and then sold to others. Walker is a country that is walking from hand to hand. They were built in Herzegovina as a result of livestock movement and migration.

New Serbia (1913) was created as a result of Dedijer's field research of Kosovo and Macedonia, which are in the Balkan wars liberated from the Turks and joined to Serbia. The state was then relying on their apprentices, and Dedijer by order of the Ministry of Education and Religious Affairs performed field tests, that the government of Serbia obtained data on these areas, which have been isolated for centuries under Turkish rule. After Cvijić, Dedijer was the most important name in geography, so he was as a young assistant professor but experienced anthropo-geographer sent to explore this area.

During his stay in Paris, Dedijer was ordered by Serbian government to make anthropogeographically map of Europe in which he was assisted by Cvijić's cartographer A. Lazić. Anthropogeographically maps are important for objective consideration of space, because they were of no use when moving borders after the war ended. Then Dedijer writes to Cvijić:

I have telegraphed that Lazić is kept on the job for me. He had to wait a little for my answer, because the mission given up on its intention to do anthropogeographical map of Europe. That job submitted to me without my desire, and after I recovered all the material from Corfu they ordered not to do the job. That's why Lazić had to wait for so lon (13484/304-34 LEGATION ROYLE DE SERBIEN EN FRANCE ET EN BELGIGUM, Paris, 5(18) x. 1916).

CONCLUSION

Cvijić's follower and supporter of the development of the modern Serbian anthropogeographically school, who brought freshness in research and continued his work was Jevto Dedijer, who was the the scientist with culturological study of Herzegovina who laid the corner-stone of modern research of landscape. After Dedijer, researching anthropogeographically mission has been continued with Radovanović who was developing it in the direction of modern geography. Serbian anthropogeographical school gave significant names that with their original scientific papers celebrated entire Serbian geographical science. It lives today methodologically modernized, cultivating a tradition that is over a hundred years old. Jovan Cvijić introduced anthropogeography into the curriculum of geography (1910) and entrusted it to Jevto Dedijer. After his death, scientist who continues with anthropogeographic research was Vojislav Radovanović. Sinuosity Cvijić–Dedijer–Radovanović is the backbone of Serbian anthropogeographically school.

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REAFFIRMATION OF THE POPULATION ORIGIN STUDIES IN SERBIA IN EARLY 21st CENTURY

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ABSTRACT: Population mobility is one of the major components of demographic and overall development in Serbia, which has multiple causal links with social elements of geospatial systems. Considering the fact that human migrations significantly determine the future directions of transformations within demographic and other spheres of development, the continuity of research in this field is justifiable. The purpose of this paper is to define the main migration flows and corridors in different historical periods and their influence on the origin and composition of the population in Serbia and also on changes in the structural population characteristics in this area. The problems of research of population origin in connection with modern population composition significantly define future directions of transformation in all areas of development in Serbia. Examining all the previous findings it is possible to establish relations between population mobility and other elements of systems of territory and population, and also the connections of migration and other elements of spatial systems, which are important for the overall development planning of Serbia.

Key words: migration, population origin, Jovan Cvijić, Serbia

INTRODUCTION

The research of Jovan Cvijić, one of the greatest Serbian scientist, in the first decades of the XX century, had very important significance from anthropological, geographical, ethnographic, sociological perspective, especially in field of studying migration and population origin. Through this researches, the history of colonization of the Balkan Peninsula was related with cultural processes and changes, which essentially determine the historical, cultural, social, demographic and geopolitical implications on the

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spatial distribution and composition of the population on micro, meso and the macro regional level. The synthesis of the main migration flows and routes over the centuries together with varied data on demographic, social, economic, cultural, ethnobiological, psychological and other changes and processes, allocates Cvijić work and its geographical school at the top of the European and world research in the field of geography and related disciplines.

The key problems which Cvijić treated since the first approaches and throughout the entire scientific work in the field of human geography were: migration, population origin and psychological characteristics of the people who live at Balkan Peninsula. He constantly emphasized that the population origin is the basis for various researches, not just anthropogeographically based, but also for the ethnographic and sociological studies. Human migration was observed as the most important and fundamental anthropogeographical question, which is of crucial importance for the interpretation of the distribution of ethnographic phenomena, dialects, psychological characteristics, social and economic way of life. Cvijić field work was very comprehensive, and therefore includes a number of his students and followers, and they had precise directives for field researches in perceiving the population origin based on the traditions of individual families. The large documentation that was collected in this research enabled the reconstruction of the main migratory flows, their causes and consequences on anthropogeographically, ethnographic, socio-cultural and geospatial features of the Balkan Peninsula.

The scientific work of Jovan Cvijić had and today has big historical and national significance both for Serbs and other people in this area, because it provided a very rich display of population migration from the period of the Turkish rule until the middle of the twentieth century. In this context, we are pointing out the opinion of the Czech geographer J. Daneš (1927) that Cvijić in his anthropogeographic research paid attention to all the nations and cultural zones of the Balkans, but he dealt more with Serbian people than other Balkan nations. He also found that among the South Slavic population that migrate to the Slovenian and Pannonian plains, many originated from the area south of the Sava and Danube.

He pointed out four main migratory flows that were predisposed with main characteristics of the relief: Dinarska from Montenegro, Hercegovina and Raška towards Šumadija (with branches to Bosnia, Krajina and Dalmatia); Kosovo-Metohija from Shkodra and Zeta, Metohija and Kosovo to Pomoravlje and Šumadija; Morava-Vardar which went from Macedonia (Prilep, Bitola, Ohrid) and Albania towards the valley of Morava and

Belgrade. The flows that crossed the Sava and Danube rivers were part of Kosovo-Metohija and Morava-Vardar flows which gathered population from the Morava, Šumadija and Eastern Serbia, and ended in Vojvodina, Baranja, Slavonia, Hungary up to Szentendre and Romania up to Transylvania (Grčić, 2004).

As a result of the researches that lasted for several years Jovan Cvijić wrote his capital work "Balkan Peninsula and the South Slavic countries" (1922) and "The anthropogeographic and ethnographic writings" (1987). His paper "Anthropogeographic problems of the Balkan Peninsula" (1902) was the first article and practically launched the edition "Settlements and origins of the population" which was part of the Serbian Ethnographic Collections of Papers (Serbian Royal Academy), which had the huge importance for further research in this field. Achievements of the Cvijić's anthropogeographic work in Serbian and other Balkan regions and countries were continued by his talented associates and followers: Vojislav S. Radovanović, Jovan Erdeljanović, Risto Nikolić, Ljuba Pavlović, Borivoje Drobnjaković, Jefto Dedijer, Tihomir Djordjević, Atanasije Urošević, Milenko Filipović, Borivoje Milojević, Milisav Lutovac, Branislav Bukurov, Jovan F. Trifunovski and many others. They branched out and expanded research movement that was founded by Cvijić, and gave him scientific actuality. In the period 1902–2005. was published 47 books in the edition "Settlements and origins of population" (Serbian Ethnographic Collections of Papers), with more than 100 anthropogeographic and ethnographic monographs dealing with certain parts of the Balkan Peninsula. At a later stage some institutes, part of Serbian Academy of Sciences and Arts such as: Ethnographic, Geographic, Balkan, Byzantine, Historical, Archaeological, Institute for the Serbian language, as well as departments of Geography at the Universities of Belgrade, Novi Sad, Niš, Priština, Sarajevo, Banja Luka, published a series of articles and special editions on migration and population origin. Some committees of Serbian Academy of Sciences and Arts: for population studies, for Kosovo and Metohija, for studying the villages and rural areas, for exploring the history of Serbs in Croatia, and also Matica Srpska and Serbian Geographical Society and other institutions, published a series of articles and monographs relating to this issue.

Despite the unrivaled scientific research of Jovan Cvijić, his students and followers in the field of migration and population origin, there were still parts of Serbia that have not been jet tested by the model of Cvijić anthropogeographical school. For that reason, after the 1970s projects of the Serbian Academy of Sciences and Arts and master's and doctoral theses at our universities, were related to this topic, and that was seen as an reaffir-

mation of studies on those phenomenon and processes. Renewed interest in comprehensive interdisciplinary research on migration and population origin arised as a result of the strengthening of all forms and types of spatial mobility of the population in national and international context, in terms of industrialization and urbanization in our country, in Europe and worldwide, which is more important in the short term changing spatial composition of population based on the divergent trends in the natural change (depopulation and population expansion). The consequences of increased spatial mobility at all territorial levels (national, regional and global) have become significantly more complex, multiplied among the elements not only in systems of geospace, but also in demographic, geo-ecological, economic, cultural, civilizational, social sphere. This has led to increased attention of researchers in the field of population science for well created theoretical and methodological procedures, in accordance with the development of scientific thought. The applicability of these studies increases, not only in the field of population policy, especially towards migration at all regional levels, but as an important segment of policies in the field of economy, public activity, social, cultural and physical development. At the same time the empirical statistical material was enriched and other statistical actions were multiplied in respect to intersections of features and to obtain detailed and internationally comparable data on different aspects of the migration phenomenon and the origin of the population. Following the example of scientific and field researchs of these phenomena in the world, and considering the rich statistical and empirical material in Serbia, but especially in the conditions of war, the disintegration of Yugoslavia and the redistribution of the population of the Balkans on the basis of migration, as well as the latest transit migration routes through Serbia, it is evident that prior to researchers at the beginning of the XXI century as a key issue just like in time of Jovan Cvijić are again questions of migrations and population origins. On one hand, it is necessary to pay attention to contemporary spatial composition of the population in Serbia, and the impact of certain migratory flows on the current population origin and further on the forming population potentials of micro, meso and the macro regional levels. Considering that, one can see the great similarity with migration flows that Cvijić anthropogeographical schools examined, which proves the cyclic performance of certain historical process (correlation of modern flows of refugees and displaced persons with migration flows that Cvijić has studied). At the same time, modern researches of migration and population origin contribute to a more detailed consideration of the Serbs and other ethnic groups diaspora in the world, especially in the context of economic migration from mid 1960s to the present days,

refugee migration and population displacement after 1990s caused by war and the breakup of Yugoslavia, and also the constant brain drain, in terms of a decades-long transition of the economy and society and economic regression in Serbia.

Recent approaches in contemporary studies of migration and population origin in the world and Serbia

The need and importance of new approaches in the study of migration, the population origin and the characteristics of the diaspora have been recognized in many countries in the world, corresponding to the expansion of theoretical thinking, methods and research techniques, expansion of empirical materials of censuses and special surveys, as well as the need for social actors for adequate population policy, not only in the domain of natural change, but especially in the field of spatial mobility of the population. In this paper we will give some illustrative examples from different countries in the world, pointing out that the primary interest of population science in Serbia today, is the interest for multidisciplinary research of all forms of spatial mobility of the population, the population origin, distribution and characteristics of our diaspora in the world. These three key problems of today's population sciences are connected and intertwined and must also be observed from the aspect of characteristics, causes and consequences of all elements of geosystems. US and Canada were among the first countries that introduced in censuses features that provide informations about the population origin. That characteristic can be seen through the cultural heritage, national origin, based on country of birth, country of parents birth or ancestors before coming to this country (e.g. the US census 2010). We stress that in these examples the origin equated with ethnicity.

Examples that shows the increased interest for the study of diaspora are numerous, and some countries such as France and Japan introduced the possibility to get citizenship even to descendants of migrants whose ancestors migrated to other countries of the world more than a century ago. The empirical material of census is still not enough for understanding population origin, causes and consequences of migratory movements, so there are many examples in the world of making a population survey of the history of the migration phenomenon through multiple generations. An example is the survey about migration history in Australia. The purpose of this survey was to explain the migration process, identifying multiple movement, return migration, the level of migration over the life cycle, then the causes and consequences of migration. It is possible to measure migration and their research across the life cycle. That simple migration

history can complete the statistical research of migration in relation to identifying the origin, scope and degree of movement of multiple life cycle for migrants whose movement will be analyzed. (Australian Statistic Office, 1979, Sentić, 2006). As an example we can underline significant UN survey carried out for the research of population migration in Chinese cities using a small sample.

The need and possibility of various sciences to explore the phenomenon of migration and origin of the population and the need for multidisciplinary approach of these phenomena is best illustrated by the application of genetic research in this field. One such project was launched by National Geographic Society in 2005 which addresses the fundamental question of the historical origins of the population of some regions starting from the fact that migration is a factor of socio-historical and geographical processes (<https://genographic.nationalgeographic.com>).

The study of internal migration in Serbia in the second half of the twentieth century takes place less on the model and instructions of Cvijić anthropogeographical school and more on the basis of statistical and empirical data, with the emergence of new and modernized questionnaires. The main objective of this studies was understanding the migration flows from villages to the cities, which as a form of modern migration, occurs from the mid-nineteenth century and between the two world wars, but particularly after the Second World War, in relation to industrialization, urbanization, deagrarisation. Migration from rural to urban areas and from less developed to developed regions were from 1950s of unprecedented scale, changing the demographic, economic, social structure of whole regions in Serbia. Research in this period was based more on statistical documentation and less on field work and focused on determining the scope and direction of migration flows, as well as the particular type of relocation of selected demographic, economic, social and other aspects of migration, rather than on monitoring of migration flows and the population origin. As an example of migration analysis in Yugoslavia we will mention those based on census 1948: "Population by homeland" (Obradović, 1955), and the study "Migrations in Yugoslavia" made on the basis of census data 1961 (Group of authors, 1971). Information about hometown in censuses after the Second World War, gave the information using the indirect method about the scope, pace and direction of population movement which gave a general picture of the migration structure of the city and the area, as well as an indication of migration streams and population origin, but with lack of knowledge about migration history, as well as the causes and consequences of spatial mobility of population (Sentić & Obradović, 1963).

In particular, we emphasize the census in 1961 in which was specially treated, for the first time, the present regional migration flows with the time component, and the selectivity of migrants by different characteristics and displacement between the settlements of various types. The main questions were: where did you come from and when, and that provide a possibility to analyse different types of migration, the starting point and duration of the migration. Considering this results in 1960s "The scheme of constant regions for demographic research" was made. Such zoning arose from the need to establish a permanent territorial unit to monitor demographic trends, for long periods, and in the study of population migration proved to be a good basis for understanding meso regional differences of migratory phenomenon in Serbia (Spasovski 2003, Šantić, 2006). Also, the very important question that was treated for the first time in our censuses was the question about circulation (in Serbian literature is called daily migrations) of student population and the labor force. According to the methodologies of the 1971, 1981 and 1991 censuses, our citizens who were temporarily abroad on account of their work, as well as the members of the family who resided with them abroad, were included in the total population of the Republic of Serbia. In compliance with the international recommendations, in the 2002 Census, the total population of the Republic of Serbia included our citizens whose work and/or stay abroad was for less than a year, as well as the foreign citizens who worked or resided in our country for a year or more. It means that our diaspora stayed out of census results since the beginning of XXI century.

We note that in research of migration and population origin after the Second World War in addition to traditional instructions of Cvijić there were several attempts of making special surveys. A trial census in 1960, was conducted in the form of survey and included a set of questions on migration: the place of birth, place of residence, how long have you lived in the place of permanent residence, from where you moved here, the place where you work, the reason of immigration, with whom you move in, but the data in the survey was not complete (Group of authors, 1971). On the basis of Cvijić guidelines for the study of migration and population origin, and for the needs of his own research in eastern and southeastern Serbia, M. Kostić in 1960s did its own questionnaire survey and results were published in the monograph "Aleksinačka Valley - socio-geographical study" (Kostić, 1969). University of Belgrade – Faculty of Geography and the Republic Statistical Office prepared a detailed questionnaire and guidelines for migration research in 1996. It was based on surveys of the UN, which was conducted in the cities of China, and they are tested on the territory of Eastern Serbia. However, they had drafted two question-

naires: the Questionnaire for Household MIG-1 and Questionnaire for migrant MIG-2. The household questionnaire contains questions about the household and characteristics of household members. They are obtained by various demographic characteristics, economic, social character, with the possibility of comparing indigenous and migrant population. Another novelty is the introduction of the characteristics of household members related to the birthplace of the ancestors through which could be reconstructed individual and family migration history, and in combination with traditional customs and nationality of ancestors obtained data are important for the origin of the population. The questionnaire for the migrant provides a complete migration history, the ability to study the migration of family and information on the impact of migration on family structures in emigration and immigration areas. The questionnaire obtained characteristics related to the cause of migration and the importance of types of migration in the demographic development in different historical periods. It is introduced as issue related to the origin of the population which gives the possibility of perceiving the modern features of migration flows and gravity zone of central places (Spasovski, 1998; Spasovski, Stanković & Marjanac, 2002).

In the scientific literature in Serbia, as well as in the world, the migration and population origin in the recent period was treated multidisciplinary. An example is the project of the Ethnographic Institute "Interdisciplinary Research of cultural and linguistic heritage of Serbia". The research was conducted in Eastern, Central and Southern Serbia and the aim was to outline ethnological research which shows the origin of the population and genetic data to indicate the origin taking DNA samples (Tododrović, 2013). Migration, as a special thematic unit (module), were one of the goals of the research survey on the living standards of the population in issue conducted in 2007 by Republic Statistical Office. One of the aims of the survey was to analyze the migratory characteristics of the Serbian population, both quantitative and qualitative, to determine whether there is a correlation between the spatial mobility of the population and the poverty line (Stanković, 2008).

Instead of conclusion

We know about migration today very much and very little. If we say we know very much we consider migration as a general social and spatial phenomena. If we say we know little that is because of the lack of comprehensive and complex research that would provide a more complete knowledge of the spatio-temporal phenomena. The individual disciplines in the world

and in our country can not consider the complex phenomena of migration, the origin of the population and the diaspora. That is why we emphasizing the need for a multidisciplinary approach to these phenomena and validity of each and any particular scientific discipline, primarily geography and demography, to search out the theoretical and methodological issues, and data sources of these phenomena. At the same time, despite the expansion of empirical data, census and migration statistics, there is a need for creation and implementation of special surveys in which every scientific discipline of multidisciplinary spectrum will be set aside for the most relevant topics for the explanation of the phenomenon of migration and population origin, their causes and consequences. At the same time our science pointed out the spatial aspects of the unfolding phenomenon of migration, the demographic characteristics of migrant populations and establishing links of contemporary and historical trends of spatial mobility with views on future trends and population policy on migration.

Modern refugee crisis, the largest in Europe since the Second World War, has the global character in its causes, extent and consequences. In connection with that since the beginning of this year through Serbia in transit crossed the 120,000 people. It irrefutably confirms the need for more detailed, more organized and more practical multidisciplinary research of the phenomenon of migration, the population origin, character and disposition of our diaspora in the region and the world. It requires commitment on these issues in scientific organizations and institutions, as well as all other segments of society in Serbia and in European and world science and practice closer to the heritage that left antropogeographical school of Jovan Cvijić. Hence, today a prior challenge to the younger generation of scientists and the entire society of Serbia is to follow a scientific way of Cvijić, his students and followers in addressing population issues and problems in a time of global migration, whose consequences for Europe and the Balkans alter the geographical distribution of population and ethnic communities through a new, still an immense composition in geospace.

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CONFESSIONAL STRUCTURE IN MONTENEGRO ONE CENTURY AFTER JOVAN CVIJIĆ

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ABSTRACT: Contribution of Jovan Cvijić to science is unquestionable, but his influence is particularly noticeable in the field of cartographic annexes which followed his research. This aspect of approach to the complex phenomenon today is still pertinent, only modernized using computerized tools. Special value of Cvijić's work is actually reflected in the fact that he had recorded the situation in the field a hundred years ago, when population statistics was not so developed. Today, when the statistical data about population is rich and diverse, it is possible to make comparison of "Cvijić's maps" and modern cartographic representations in order to get insights into dynamic changes that have occurred over a period of a century. The focus is on the confessional structure with groups by modalities of religious affiliation. The aim of the paper is the comparison of confession structure of Montenegro, which Cvijić recorded in 1913 and the one recorded in the 2011 census. Using the technique of overlapping layers, the changes that have occurred in the studied period are presented on the final map. Listing of certain municipalities that went through the major changes when it comes to religious structure of the population is done with an overview of the major differences between the past and present. It may be concluded that from once religiously monolithic country, Montenegro has become heterogeneous, mostly as a result of territorial expansion. Although the Orthodox religion is still predominant, certain municipalities have a significant share of other religions.

Key words: confessional features, historical cartography, Montenegro, Jovan Cvijić

INTRODUCTION

The most famous Serbian geographer, Jovan Cvijić, has contributed to a number of disciplines which are part of geographical science today. His

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studies and field observations of certain social and demographic characteristics of the Serbian and neighboring countries could be called pioneering according to many criteria. The first decades of the twentieth century were characterized by his productive work on anthropogeographic topics, as well as defining the zone of civilization, psychological types and studies of migratory movements. Recorded by Cvijić century ago, some general lines about certain characteristics of the population in Balkan Peninsula are still very important for understanding the current demographic development. Features of "integration and permeation" or "separation and isolation" are useful logical apparatus to monitor and present demographic movement. These tools were used for theoretical conceptualization of Balkan geopolitics, and their outlines can be seen in other modern theories (Grčić, 2004, 2008). Also, it should be emphasized that the maps that Cvijić made can be used to study the dynamic changes in selected geographical area, in this case Montenegro.

The history of the Balkans in the last hundred years was marked by turbulent events starting with the regional wars in 1912 and 1913, than two World Wars (first from 1914 to 1918 and second from 1941 to 1945) and those with an ethnic background during nineties, as well as changes in the political organization or redrawing of borders. One of the countries that in the given period went through a particular transition is Montenegro. After the Berlin Congress in 1878, it gained its independence, than after the First World War was part of the Kingdom of Serbs, Croats and Slovenes, and after Second World War part of Socialist Federal Republic of Yugoslavia. Montenegro is again independent and autonomous state at the beginning of this millennium, in 2006. This fact determined the interest in the study of changes in the structure according to religious affiliation of the Montenegrin population, i.e. a comparison of the situation that was mapped by Jovan Cvijić in 1912 in his "Anthropogeographical and ethnographic writings" and the one recently recorded by the census from 2011, the first modern census in Montenegro that was independently carried out.

HISTORICAL BACKGROUND

Balkan Peninsula was often in the sphere of influence of global forces, and Montenegro is in its political emancipation from precisely this reason, depending on the given circumstances, received or lost territory, which was also characteristic for the other people and countries in its immediate environment. It is important to emphasize that it is considered that the Monte-

negrin identity existed as an idea that well developed, coherent and consistent, built up independently of the other European ideological principles, or ethnographers or travel writers. However, Jovan Cvijić should be singled out as someone who defined dinar type (Čagorović & Carmichael, 2006).

Since the period of this study is limited to 1912 (and 2011), when Jovan Cvijić published the first map that shows confessional structure of the Balkan Peninsula, we will first focus on a number of decades before these historical point. The reason lies in the fact that the territorial area of Montenegro which is shown on said map is different from the present, which is not surprising given the hundred-year time distance. As the initial year of analysis and historical circumstances that led to the formation of the borders of Montenegro on the map from 1912, we set 1878 for two reasons. Both reasons are related to peace conferences, one the San Stefano and other Congress of Berlin.

While Montenegro was linked with Russia as Orthodox patron and maintained that political connection for a long time, closeness of the Ottoman empire, and its slow but sure decline led to an intensification of the impact of the Austro-Hungarian Empire. No wonder that the Congress of Berlin actually reversed some decisions made in San Stefano, because the European powers considered that the influence of Russia in the Balkans would be too strong. Congress of Berlin also recognized Montenegro as an international legal entity, but it took some territories that were already given to it according to San Stefano peace in Herzegovina, Sandžak and in northern Albania. Austro-Hungarian aspirations towards Bosnia and Herzegovina, but also to the Sandžak and Novi Pazar, clearly indicated that although Montenegro is interested in a particular territory, the chances of their annexation to its country almost does not exist (Hall, 2000; Andrijašević, 2009). Cvijić (2000) emphasizes that Sandžak and Novi Pazar is of great political importance, because the territory is between the three countries, Serbia and Montenegro, on the one hand, and the Austro-Hungarian on the other hand, and that it is *political isthmus* which the Treaty of Berlin left in order that Serbia and Montenegro could not be direct neighbors. For these reasons, Montenegro turned to realistic possibilities that saw in the area not controlled by Austro-Hungary, but the Ottomans, and which meant their aspiration spread from Shkodra to Bijelo Polje, and Shkodra, Bijelo Polje, Berane and Peć become the most attractive (Andrijašević, 2009).

Based on San Stefano Treaty (1878), the territory of Montenegro has increased almost three and a half times, whereby territories that were received were Berane, Bijelo Polje, Pljevlja, Prijepolje, Tutin, Rožaje, Rugova, Plav, Gusinje, Nikšić, Gacko, Podgorica, Kolašin, Spuž, Žabljak as well

as access to the sea. The composition of its national territory included almost the entire Skadar Lake and port of Bar. However, the Treaty of Berlin, there was an audit and Montenegro was mostly damaged in the coast. Still, territory of Bileća, Gacko, Zubac, Crkvice had to be given back to Austro-Hungarian Empire. In addition to territorial changes that took place after two international peace treaties, there have been some changes in the political and governmental life of Montenegro, but also changes in some demographic structures. The reason for these changes is viewed in Montenegro's territorial expanding during the last decades of the nineteenth century, so together with territorial increase, there has been increase in population number and structure. It should be noted that the Austro-Hungary insisted on certain clauses of the Berlin Treaty related to Montenegro. In addition to those relating to maritime affairs, for this topic are more important articles related to the right to the protection of the rights of residents from newly united area. As noted above, residents who lived in the territories that now officially belonged to Montenegro differed in religious affiliation when compared with rest of indigenous population. For this reason, in the Article 27 of Berlin agreement, equality of Muslims and Catholics in the new state was guaranteed, as well as the inviolability of property and civil, political, economic and religious rights. This is when absolute religious and ethnic homogeneity disappeared, which previously existed in Montenegro (Andrijašević, 2009).

RELIGIOUS AFFILIATION ON BALKAN PENINSULA FROM CVIJIĆ ONWARDS

Since the focus is on Montenegro, on Figure 1. is emphasized territory of the country, as Cvijić mapped it. In order to have better visual comprehension of the map, legend was enlarged. Also, it is important to add that blue color is representing Orthodox population. Map of the Balkan Peninsula from 1912, in addition to showing confessional patterns in this area, shows also state borders, actual at the time. What is first noticeable is that the coastal strip, which is now part of the Montenegro, a century ago was significantly narrowed.

Cvijić (2000) when writing about the liberation of the Serbian lands and solution of "Eastern Question", underscores that simultaneous with the successive expansion of Serbia to the south, there has been a widening of Montenegro as a result of continuous struggle with Turkey, which in 1878 managed to merge Bar and Ulcinj. Although the Boka Kotorska briefly belonged to Montenegrins in 1813, the port only after the Second World

War is again part of Montenegro. Also, a large number of municipalities which now belong to this country were in era before the Balkan wars controlled by great powers.

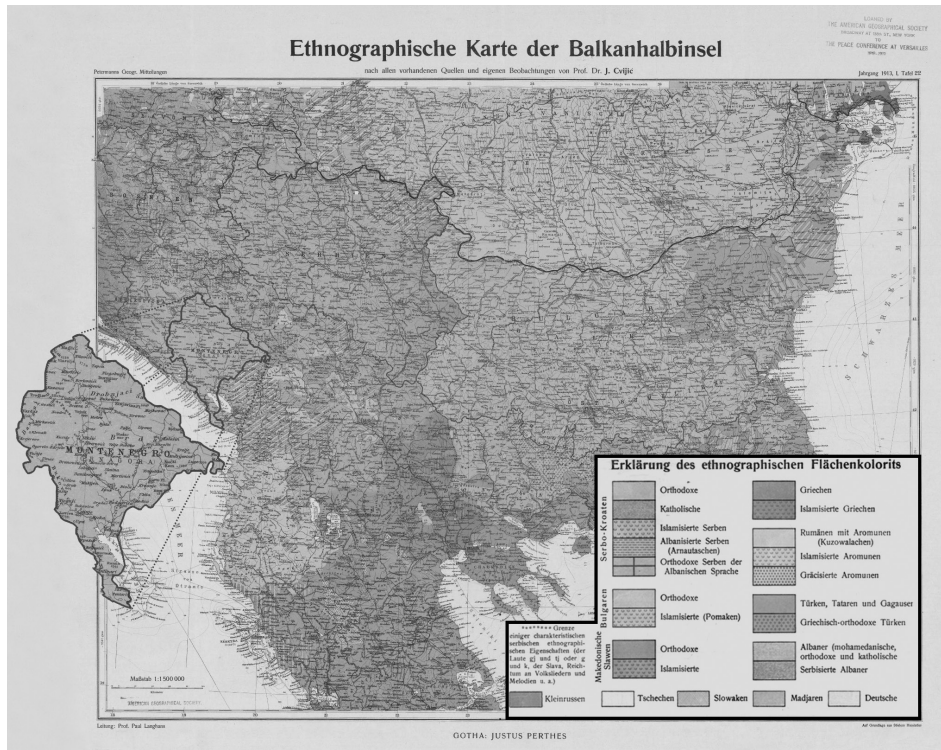


Fig. 1. Religious patterns on Balkan Peninsula, by Cvijić, 1912

Religious structure of Montenegro according to 1921 and 1931. Censuses

The last census in Montenegro held in 2011 showed that the state had 620,029 inhabitants, while a century ago, according to estimates, was twice smaller. Population movements in the first half of the 20th century was under the dominant influence of numerous and frequent wars which have caused enormous human losses and decreasing the total population of Montenegro. First reduction of the population of Montenegro is recorded at the end of the Balkan and First World War, after which demographic renewal followed (Penev, 2008).

However, in order to shed some light on the situation a century ago when the confessional structure is in question, the closest censuses which we analyze are the one from 1921 and 1931. The inhabitants of Montenegro were predominantly Orthodox because around three-quarters of the

population said they professed Orthodox in 1921, and the following census shows the share was even higher. However, even then Islamic and Catholic religion was present, with specific regional patterns. Since administrative changes took place between these two enumerations, data are listed as published in given censuses.

Table 1. *Population according to religious affiliation, census of 1921*

	Total	Ortodox	Catholic	Islam	Ortodox	Catholic	Islam
		Total			%		
Crna Gora	199227	167499	8319	23300	73.72	4.18	24.70
Andrijevica	24624	18154	388	6081	42.50	1.58	44.36
Bar	28638	12170	3723	12705	98.76	13.00	1.03
Kolašin	14899	14714	31	153	99.05	0.21	0.41
Nikšić	50516	50037	270	205	84.74	0.53	7.94
Podgorica	48651	41225	3513	3865	97.81	7.22	0.91
Cetinje	31899	31199	394	291	84.07	1.24	11.70

Source: The definitive results of the census of 31 January 1921

Table 2. *Population according to religious affiliation, census of 1931*

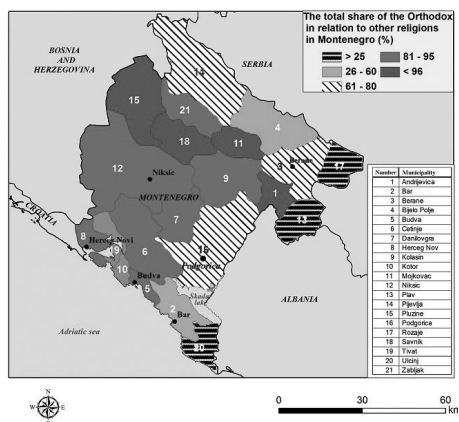
	Total	Ortodox	Catholic	Islam	Ortodox	Catholic	Islam
		Total			%		
Crna Gora	360044	272702	26070	61038	71.43	1.38	27.20
Andrijevica	27221	19443	375	7403	42.89	15.20	41.90
Bar	32926	14122	5004	13796	59.75	0.52	39.72
Berane	31003	18523	162	12314	61.09	0.12	38.79
Bijelo Polje	32907	20102	40	12765	96.12	2.95	0.80
Cetinje	27496	26429	810	221	99.20	0.28	0.50
Danilovgrad	17859	17717	50	90	98.57	0.76	0.65
Kolašin	15826	15600	121	103	63.39	35.14	1.08
Kotor	38989	24715	13702	421	98.29	0.98	0.71
Nikšić	37196	36559	366	264	71.39	0.90	27.68
Pljevlja	33196	23698	298	9187	78.02	11.87	10.08
Podgorica	42904	33474	5094	4324	99.11	0.21	0.67
Šavnik	22521	22320	48	150	75.74	7.24	16.95

Source: The definitive results of the census of 31 January 1931

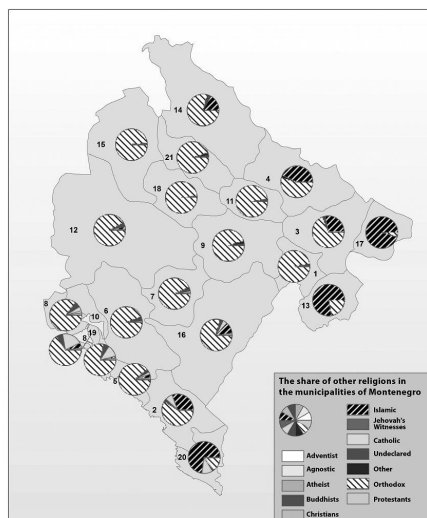
After the Balkan wars and World War I, there were the new political changes, and Montenegro after the Treaty of Versailles became the part of the Kingdom of Serbs, Croats and Slovenes, later the Kingdom of Yugoslavia. After the Second World War, it was part of the Socialist Federal Republic of Yugoslavia, and after the nineties, state union with Serbia was formed. In this centuries time distance, it is showed that Montenegro expended in comparison to the period which Cvijić researched, which will be displayed on the synthesis map.

RELIGION STRUCTURE ACCORDING TO THE 2011 CENSUS

Observing the map that shows the proportion of Orthodox Christians in total population of Montenegro according to the 2011 census (Figure 2), it is clearly evident that the territories which were part of the Montenegrin state a hundred years ago are those where the highest proportion of this population is. On the other hand, the newly added territories after expansion, are populated by those who according to the subjective criterion stated that their religion is not Orthodox. Thus, the minimum percentage of Orthodox is in Rožaje, Ulcinj and Plav. If one analyzes the “Cvijić’s map” created a century ago, it is noted that the in area of Podgorica existed a certain segment of “serbified Arbanas” so that the last available data for 2011 show that 78% of the population of Podgorica is of Orthodox religion, while 11% are Muslim.



▲ Fig. 2. Proportion of Orthodox population, Montenegro, 2011

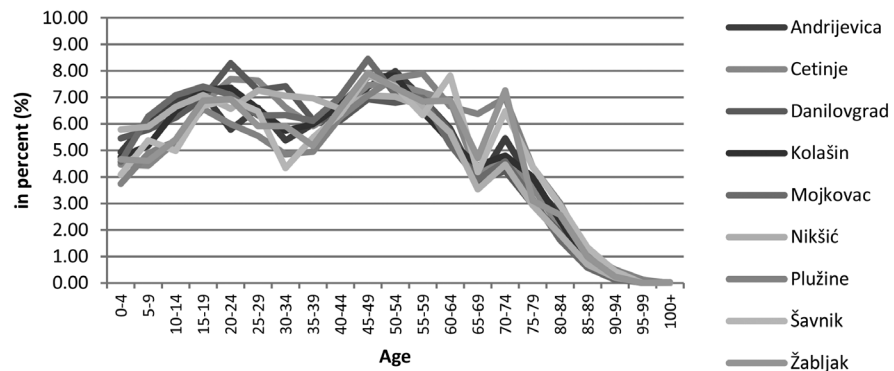


▷ Fig. 3. Religious structure of Montenegro, 2011



In order to show the representation of different religions in Montenegro, the Figure 3 shows the share of all confessions recorded by the 2011 census. The most notable is that the Islam religion has the most shares in those municipalities where the proportion of Orthodox is lowest. Also, it is noticed that in Herceg Novi, Kotor and Tivat, share of Catholic is higher in comparison to other municipalities of Montenegro. In the same municipalities is noticeable that share of those who did not declare about confession is bigger compared with the others, although that share is not generally large. The modalities such as Adventist, Agnostic, Atheist, Buddhist, Jehovah's Witnesses exist, but in the aggregate have very small shares. Also, in some municipalities, inhabitants declare Islam and in other Muslim religion. The most particular is case of municipality of Bar, where share of Muslim religion is 10.3%, and share of Islam religion is 19.8%.

Age of population is an important feature of the demographic structure, and is especially important when it can be intersect with some other features. In this case, religious affiliation can be observed depending on the age of persons who reported that confess given religion.¹ If we compare municipalities that have a high proportion of residents who identified themselves as Orthodox (Andrijevica, Cetinje, Danilovgrad, Kolašin, Mojkovac, Nikšić and Plužine), it is possible to conclude that they have quite uniform age structure. That is, the share of children is relatively small, while the share of those aged over 65 years is rather large.

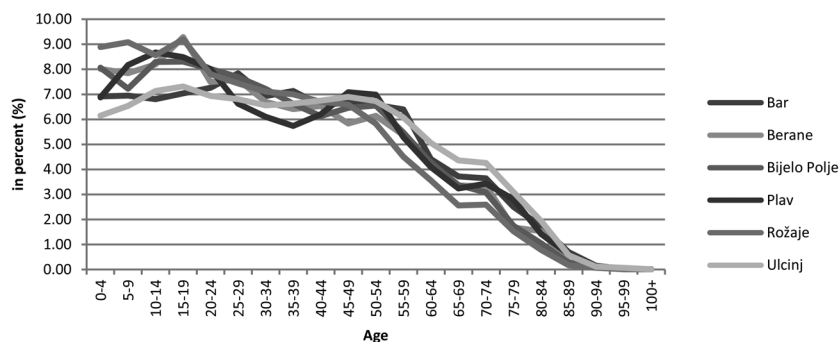


Montenegro, 2011

Look at the Figure 5. which refers to residents who said they profess Islam (more than 20% in Bar, Berane, Bijelo Polje, Plav, Rožaje and Ulcinj), clearly shows that the share of children is very high, while the share of

¹ Except for persons under the age of 15 years, on whose behalf the parents declares.

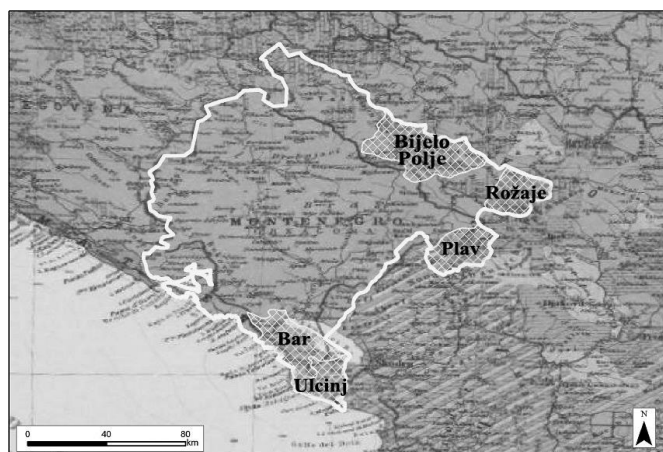
elderly is quite small. We emphasize that analyze is limited to modality of “Islamic” religious affiliation, although in the same municipalities there are non-negligible share of those who declared themselves as Muslims, as already stated.



Fig

on-

Synthetic map that is created by overlapping layers gives the opportunity of comparing the territorial borders of Montenegro in 1912 and 2011. It is obvious that Montenegro has expanded its territory in the last century, and that part of the former “buffer” zone created at the peace conferences to delimit Serbia and Montenegro now is part of the country. Also, today the border that goes along the sea coast is considerably longer than it was a century ago.



► Fig. 6. Municipalities with the lowest share of Orthodox population, Montenegro, 2011

Still, it should be added that the area which has in the mean time become an integral part of the country was also settled with residents who were not

of Orthodox religious in time of Cvijić. In the municipalities of Bijelo Polje, Rožaje, Plav, Bar and Ulcinj, the proportion of Orthodox according to the last census was significantly lower compared to the remaining municipalities of Montenegro. On the other hand, the central area is still predominantly inhabited by Orthodox, as well as in time when Cvijić conducted his research.

CONCLUSION

As the topic of the paper is posed the comparison of cartographic representations which Cvijić used a century ago and nowadays religious distribution in order to examine the changes of confessional affiliation of the population of Montenegro. The major changes that have occurred in this period are reflected in the borders delimitation and confessional belonging of population to different religious groups. Montenegro is one of the rare countries which at the time Cvijić's mapping was an independent state. Meanwhile, it was part of the Kingdom of Serbs, Croats and Slovenes, then part of the Socialist Federal Republic of Yugoslavia, and after about a century, Montenegro regained state independence. When we compare the changes that occurred since 1912, with the data available from the 2011 Census, on the first sight it looks that Montenegro is no longer monolithic country when it comes to confessional structure as it was. But, if we take into account the borders that have been recorded by Cvijić, which are different from actual ones, we could conclude that not much have changed. Contemporary Montenegro is characterized by a greater heterogeneity, but with emphasis that this is largely owed to newly added territories. Also, these territories were at the time of Cvijić also settled by inhabitants of Islamic or Muslim religious. As a conclusion can be drawn that even though it could be expected that 100 years is a period of time when great changes can occur, especially when knowing how many war years was in the meantime, population living in Montenegro today has similar religious characteristics like during the study of Jovan Cvijić.

ACKNOWLEDGMENTS: This paper presents the results of research on Project "Geography of Serbia" 47007 funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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THE ROLE OF CVJIJIC'S RESEARCH IN IDENTIFICATION OF INTANGIBLE CULTURAL HERITAGE

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ABSTRACT: Cvijić's school of anthropogeography was the base of creation of the contemporary social geography, ethnology and ethno-psychology in Serbia. Additionally, based on the extensive scientific material that this eminent scientist collected, we can say that Cvijić was the first to begin to identify intangible heritage of the Balkan people. Recognizing the importance and the need for safeguarding of the intangible cultural heritage, UNESCO launched an initiative in 2003, and in Serbia the recording process begun in 2012. In this article, we address the recognition of the previously identified elements of representative intangible heritage of Serbia that can be found in Cvijić's anthropological and ethnological research. This will highlight the importance that Cvijić's research has in this process, considering that it is the direct way to confirm the authenticity and long tradition of this kind of Serbian cultural heritage. Only with the in-depth research, documentation and presentation of intangible cultural heritage, in its traditional and contemporary forms, it is possible to ensure the preservation, without the canonization of the past and the formalization of the present.

Key words: anthropogeography, cultural identity, intangible heritage, Jovan Cvijić, Serbia

INTRODUCTION

Jovan Cvijić is considered for the founder and driving force of the anthropogeography and ethnology schools in Serbia, which is a starting point of most of the research work in the Yugoslav social sciences of the 20th century. "Even though in the scientific circles, he is primary and most often defined as a geographer and anthropologist, but also, at least to some extent, as the founder of ethnology as well as a sociologist". In this period, there is an important connections between different scientific disciplines,

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such as geography, ethnology, anthropology, history, archaeology and sociology, which is reflected in the pursuit of a multidisciplinary approach in the research, especially if we bear in mind that this kind of research was carried out by mainly gifted scientists mostly trained as naturalists (Šafarik, Cvijić, Pančić, Žujović) who are wholeheartedly engaged in various disciplines (Palavestra, 2014). While Jovan Cvijić did not consider himself an ethnologist, under his role as “the founder of the science of our people”, he may be considered to be the founder of the population science but not in the ethnological nor cultural sense. His contribution to the development of ethnology, its institutionalization and affirmation is unambiguous (Prelić, 2014). Cvijić’s Balcanology and human geography provided a basis and a different model of the archaeological studies, facing the “history of long duration”. Here, as well as in ethnographic and ethnological research, exists a theoretical connection with Cvijić’s anthropogeographical school and his cultural models (ethnographical and historiographical), which are widely used. Only by using the data of archaeological research, questions on antiques or origin, as well as some of the true essence of ethnological phenomena can have been successfully tackled (Palavestra, 2014); while geography as a science successfully address issues of spatial distribution of phenomena, as well as its presence in certain nations. The connection between history (archaeology), ethnology and geography refers primarily to determine the prevalence, traditionalism or long duration of certain customs or deep root Serbian mythology and ritual practices.

In a special way, “J. Cvijić made from anthropogeography a synthetic science of relationships and interactions between the different categories - nature (geographical areas), society (history, economic and family organization, settlement and migration, political action and behavior, acculturation and assimilation) and human (biological and psychological features and their formation) (Grčić, 2004). He studied migration flows, rural and urban settlements, house types, material culture of the population in the zones under different cultural influences, psychological types and varieties of people, traditional costumes and furniture, etc. Unlike his contemporaries, anthropologists who have directed their attention to the forms of material culture - the economy, settlements, houses, roads and the like, while they were not interested in the forms of social organization, spiritual culture and religious beliefs, in Cvijić’s works for the first time we can find topics such as “metastasis currents”, “civilization zones” (cultural belts), psychological types, etc. (Grčić, 2003). “J. Cvijić is the first scientific examiner of our people, the first scientist who went in person to the people and with direct observation and examination of the people, conducted studies in order to come to the scientific results”

(Erdeljanović, 1927, 203). He launched and established a broad movement in Serbia in order to explore the folk life, which enabled the creation of the first methodologically and systematically collected data from the field of ethnology and geography. He therefore, in his research emphasizes the need for multidisciplinary and interdisciplinary approaches, with mandatory direct observation in the field.

Methodological plan for field research was set in the form of “Guidelines for the study of villages in Serbia and other Serbian lands” that was issued in 1896. In this Guidelines he listed the items that would be desirable to examine more profoundly in order to obtain scientific material. In their interpretation causal connections and comparisons should be made. He points out that it is very important to know the history of the village, the origin of the population, nationality, dialect, religion, occupation of the population, main celebrations (patron saint celebrations), etc. In addition, he emphasizes that attention needs to be paid to a specific features of the population (e.g. in costume, language, customs, etc.). He also predicts the collection of materials that contains certain stories, legends and interpretations of the names of villages and hamlets, as well as the occupation of the population, where special crafts and traditions are mentioned, among which there are some almost completely vanished nowadays.

Based on systematic research of Balkan region, Cvijić defines regional geographic boundaries and ethnographic boundaries of the Balkan peoples. He explains the existence of cultural zones and cultural influences that have contributed to the definition of national borders. But he also defines the basic psychological characteristics of the Balkan nations. In its cultural work on the study of the settlement, Cvijić touches some elements that can certainly be identified as the intangible cultural heritage of the people. In particular, parts of his extensive studies dealing with the characteristics of the population and the ethnographic materials, contain certain parts which could be considered for the beginning of identifying process of the intangible heritage of certain nations.

CULTURAL AND NATIONAL IDENTITY – THE ROLE OF INTANGIBLE HERITAGE

Cultural identity is a part of personal identity of each individual or a group. In this sense, the cultural identity of the individual evokes a sense of belonging to a nation, ethnic group, religion, social class, the local community, as well as any social group with its own specific cultural characteristics. Culture is for a particular community specific way of life

organization and system of behavior and values, which is changed during the life of the group (Rot, 2006). Culture of a society is reflected in the nine areas of life: language, material characteristics of the community (type of housing, food, tools, clothing, existing professions), art, mythology, beliefs and knowledge, church organization and religious practices, family and social system, property, community management and of warfare (Wissler, 1923). Therefore, cultural identity is a characteristic of the individual and culturally identical groups in which all members share the same cultural identity. Cultural identity is a much broader concept than national identity, even though the characteristics of the cultural identity are very often used in the history as the basis for strengthening national identity (specifically, language and religion). These two cultural aspects in the political turmoil were used as a pretext for fragmentation and separation of culturally close nations. Culturally, the entire Balkan region, largely has a very similar, if not unique cultural identity (Terzić, 2015). Regional identity (the Balkans as a whole), as well as its structural characteristics, considering that it has a common cultural nucleus of the people in this area, is not only evident in terms of common cultural heritage, but also in their expectations and similar responses to modern challenges. Development of *geoculture*, as an expression of the relationship between geography and culture, and their joint impact on the social development and identity of the nations in the Balkans, can be seen as an expression of the difference arising from the national cultural identities and their influence on the development of the nations and the states in a certain area. In addition to fostering national cultural identities in the Balkans, it is necessary to expand the consciousness of unity and regional identity as a factor in the positive development of identification of youth generation and its European future (Mitrović, 2002).

The ideology of traditional/ethnic nationalism is closely linked to “the preservation of national identity”, the revival of traditions and ethno-myths, universal fascination with the past and the “roots” - all of which essentially marks the social and political reality of Serbia for almost two decades. With the new concept of national identity, which is inextricably associated with the independent, territorial bounded nation-state, a new cultural/national form imposed by the revival of the past and national myths was created. The pattern is defined as a homogeneous culture, national borders closed system of values which are the basis of national identity (Malešević, 2005). In order to revitalize the Serbian cultural identity, the initiative of identification of those cultural elements which are dominant and unique was launched. The preservation of proper cultural traditions

and cultural/ethnic identity is one of the most important national interests. Therefore, it is necessary that modern anthropological, ethnological and ethnographic research in Serbia inevitably pay a greater attention to the research of traditional culture, focusing on the spiritual culture of the Serbs that can be subsumed under the intangible cultural heritage.

SERBIAN INTANGIBLE HERITAGE IN CVIJIĆ'S ANTHROPOGEOGRAPHICAL COLLECTIONS

The concept of protection of intangible cultural heritage, although seemingly brand new, in science exists since the dawn of human geography, ethnology and anthropology, as scientific fields which intensive development began in the 19th century. Even before that, the interest in intangible cultural heritage can be discerned in the travel reports, missionary reports and other texts written by travelers, writers, sailors, philosophers, researchers from different fields and various other authors. Here we can find the descriptions of the people, their lifestyle, dress, customs, religious rituals, appearance of villages and houses, extraordinary technology and knowledge, knowledge of cosmology, calendars and description of the universe, mythology and religion. It can be said that in these historical documents we can find the beginnings of what is now called the intangible cultural heritage of different peoples around the world, or anything else that today's (current) concept of intangible cultural heritage should protect (Gavrilović, 2011).

Cultural zones and influences

A special place in Cvijić anthropogeographic research have so called "cultural belts" of the Balkan Peninsula, which describe cultural influences of different civilizations. "There is no anthropogeographical and ethnographic phenomena, which would not be influenced by: plastic and general nature of the land, ethnical moment and eventually a variety of cultures. Recently the ethnography recognizes the common folk thinking, due to which often occurs that in remote areas the same forms of material culture and other spiritual and moral terms exists; which brings to consideration the receiving and transmitting of the ethnographic phenomena from one nation to another" (Cvijić, 1902). He noted the existence of four main cultural circles of the Balkan Peninsula: 1. Byzantine-Aromanian (Cincar and Greek influences); 2. Patriarchal cultural belt (Bosnia and Herzegovina, Montenegro, northern and central Albania, Serbia with Old Serbia and northern Bulgaria); 3. Patriarchal zone is interconnected with the so-called Turkish-Oriental impacts, determined by the historical moments in this area; 4. Italian

cultural circle (narrow west coast of the Balkan Peninsula) and 5. Central European cultural circle (northern and northwestern Sava and Danube regions of Serbia) (Cvijić, 1902).

Strong cultural influences of various nations and cultures in the Balkans have caused not only mixing and adoption of certain cultural elements, but also contributed to the creation of entirely new cultural expressions resulting from the combination of folk practices in cultural creativity, material and immaterial. As certain intangible cultural heritage can be recognized as common for several nations, from the ethnographic elements adopted from other nations completely new cultural expressions may develop. For example, the technique of making Pirot carpets came from old oriental practices, while the symbolism and motifs on the carpets are developed as a completely new and unique expression of folk art among Serbian people. The characteristics of folk costumes in the southern parts of Serbia and the Muslim population in Bosnia have an obvious Turkish influence (e.g. *dimije* as part of Serbian national costumes in Vranje region), as well as numerous crafts technics, e.g. silversmith craft (filigree technique).

Migration flows

Strict boundaries between peoples and cultures of the Balkans are almost impossible to draw, considering that the historic developments in this area have caused considerable mixing of peoples and cultures. Moreover, political boundaries are variable categories, not able to limit the cultural changes and create a unique and constant ethnic and cultural identity. Migration flows and generally all the important demographic trends, can drastically change the social and cultural composition of the population and thus force people to reconsider the meaning and values of their own cultural identity and cultural differences (Saad et al., 2013; Terzić, 2015). The Cvijić's research on migration flows are of great importance for the interpretation of the distribution of ethnographic phenomena, dialects, ethno-psychological characteristics of people, social and economic ways of life, which were determined based on the origin of the population and traditions represented in some groups. Besides the impact of the elements of the environment, major historical trends and migratory processes, some cultural processes are also discussed, emphasizing that in the Balkans "there was a major consequences to the cultural situation of certain areas, for the origin, the development and disappearance of some towns and cities, for ethnographic mixing and blending, and the remains of various cultures" (Cvijić, 1902) that exists in this area. He emphasizes the biological and ethno-cultural

mixing and permeation of the population, equalizing psychological types of Serbian population and other Balkan peoples, through a number of assimilation and acculturation processes, etc. This interference is caused by large historical migratory processes in the Balkans. However, the merger and acquisition of certain cultural characteristics contributed to a great extent to the similarity and common South Slav origin of the peoples living in this area.

Migration flows enable the concrete transmission of cultural heritage elements, especially the intangible heritage, during colonization process of new geographic space. It is quite common to retain cultural qualities as a form of national (ethnic) identity and national expression of individuals during their adaptation to the new environment. These elements members of the same nationality recognize as their own and use it in order to distinguish themselves from others. Such examples are: living tradition of singing "ojkača" or Krajina songs in Vojvodina region, practiced by settlers from the Bosnian Krajina; then, the custom of the safekeeping of the Christ's tomb which once practiced in Vrlika village in the Dalmatia during the Easter, which is nowadays transferred to Serbia (in Batajnica village) by Serbs originating from Vrlika, that were expelled in 1995 from Croatian territory; Naive art of Slovaks, etc.

Ethno-psychological types

"Cvijić's studies on the Balkan psychological types and varieties, about the relationships between anthropogeographical and cultural factors in the constitution of national and regional identity, is really one of a kind contribution to the sociological study of geoculture of the Balkans" (Mitrović, 2002). Ethno-psychological characteristics of the South Slavs that Cvijić outlined, were often quoted but also the most disputed part of his scientific contribution. Based on his research he concludes that there is an ethnic and psychological unity of the South Slav peoples and thereby he highlights the existence of four main ethno-psychological types: 1. Dinaric people, of which over $\frac{3}{4}$ are Serbs (Šumadija variety, Era variety, Bosnian variety, Mohammedan variety, Lika and the Adriatic variety). For this type Cvijić states the following characteristics: a high moral and intellectual qualities, striving for a strong connection with nature and ancestors (tradition), striving for kinship and tribal organization, respect for the cult of ancestors, celebration of the patron saint custom, the high national consciousness, military virtues, sadness (historical sadness and a sense of injustice, the syndrome of the "God's people"); As a first sociological basis and the main factor of development of mental qualities of Dinaric type Cvijić established



Fig. 1. "Krsna slava", author: Beta Vukanović – Babet, 1900 (<http://www.tvorac-grad.com/>)

patriarchal social order (Nedeljković, 1929). 2. Pannonian type (Slavonian variety, Srems-Banat variety and Slovenian-Alpine variety); 3. Central type (Kosovo-Metohija variety, Morava-Vardar variety, Western Macedonia variety, and variety of Šops); and 4. Eastern Balkan type (Middle Gora variety, South (Rumelia-Trakia) variety and Pomak variety).

In defining the above mentioned psychological types of Balkan peoples, Cvijić uses a variety of historical and ethnographic sources. In this process he identifies the national spirit and national cultural heritage, but also records certain elements of "spiritual" intangible culture of Serbs.

Elements of intangible cultural heritage

Patron saint feast (Serb. *krsna slava*). In his anthropogeographic and ethnographic research, after which the first complete ethnographic map of the Balkan was created, Cvijić as one of the main characteristics of ethnic separation between similar population masses of Serbs and Bulgarians, takes geographic distribution of, according to his words, "the most important Serbian custom – the patron saint feast". "Serbian people do not have any warmer nor deeper tradition that is personal because it is linked to the family and generations continue to practice it through the centuries". He also notes that the patron saint celebration is also present in western Macedonia, where it is celebrated since the beginning of the 11th century (Cvijić, 1987, 134). Dinaric Serbs reversed the Orthodox faith to great extent so they gave it a stamp and specific meanings, so it can be said that it is really "Serbian faith", their own creation, which, after the collapse of a state becomes a guardian of national unity" (Cvijić, 1987, 185). "Commune, narrower or wider, is related deeply with mutual sympathy and respect, and it has, from the north to the west, as a whole, its symbol, its meaning in the celebration of a patron saint, or serving to one saint, that is its lively and spiritual patron. Under the old Serbian name "the service" South Serbs celebrate patriarchal custom of celebrating a patron saint. On the feast the commune unity is shown, as well as abundance and happiness. Guests are offered many and various dishes and wine. There is also singing and joking, so it is an intimate and noisy festivity that lasts until dawn. "The custom is transmitted from generation to generation, so that whole family has the same patron saint ("service") and this serves as a symbol of mutual relationship after the division of larger a communes" (Nedeljković, 1929, 7–8).

The celebration of the patron saint among Serbian people persisted until today in almost identical form as a practice that was usual more than

a century ago, when this custom was described by Cvijić (1927), and then Nedeljković (1929). Despite tendencies to eradicate this primarily a religious custom, as a politically misfit during the Communist government after World War II, the custom survived. Celebrating the patron saint is not present only in a relatively small percentage of extreme communist oriented Serbs (former Communist Party members). However, the practice is usually continued by the descendants after skipping a generation or two. This custom is so widespread and well-established among Serbs that it became a strong national and ethnic symbol, a part of the identity of the Serbian nation. It is practiced by the vast majority of Serbs in Serbia and almost the entire Serbian diaspora. In addition, in early 2015, it was placed on the UNESCO's representative list of the world intangible heritage. Today it is the first and the only internationally recognized symbol of Serbian culture, unique in the world.

Language and folk songs. "Dinaric Serbs created folk language that is so perfect that can be immediately taken for a literary language. It conquers and spreads outside the area of dinar Serbs. The language of this zone is harmonious, sonorous and rich in words, full of images and metaphors; this is proven by folklore, especially folk songs. We do not have any other creation in which folk soul can be reflected so fully as in folk (epic and lyric) songs. In them, people knew how to express his views of world and life, their feelings and opinions, and especially that sole and simple way of expressing emotions and opinions, national thought and national pride" Cvijić (1987, 265). National consciousness is consisted of certain national traditions. In their collective memory, among many dukes, kings and heroes, heroic figure of "King Marko" and "Kosovo Battle" is kept alive. Many epic and lyric poems, stories and myths are created on that basis. It can be said that in that memory lives the whole national past (Nedeljković, 1929). Folk song present some basic psychological characteristics of people, and Cvijić use it for describing some main characteristics of Serbs: impetuosity, morality, patriotism, ingenuity, etc. (Cvijić, 1987, 185–186). Singing with the "gusle" instrument, primarily of epic poems, was the common folk practice in the past. However, it has come almost to extinction in the contemporary Serbian society, and this tradition is kept alive only through the engagement of cultural clubs in various parts of Serbia and Montenegro. Since 2011, this tradition is listed in the national register of intangible cultural heritage of Serbia. Another representative of contemporary intangible cultural heritage is Vuk's Parliament in Tršić, which is inextricably tied to the national language, folk epics and lyrics and the reformer of the modern Serbian language, Vuk Stefanović-Karadžić.

Connections with nature and ancestors. "On the natural and historic objects has the dinar man among the old, mysterious, mostly dark stories, even more often clear stories from the folk or regional past. They are deeply cut into the soul of the striking and creative people. They are the symbol of the place and its surroundings and therefore they are having a strong influence on forming even the subtlest lines of the national soul. The intimate connection with nature is expressed in many warm ancient traditions and deeply grounded in everyday habits, beliefs and witchcraft. These are related to the change of the seasons, the cosmic and the climatic phenomenon. Such warm traditions are practiced for Christmas, Easter, St. George's Day, Midsummer and St. Peter's Day; such as natural and naive feasts that are related to mountain peaks and valleys, that people of certain village or the whole area practice once a year; such customs are rainmakers (so called *dodole*)" (Cvijić, 1987, 258). He says that the people believe that the nature is alive, believes in ghosts of water, earth and trees, forest fairies, the wind masters, believes that in lakes live winged horses, water bulls, angry dragons, etc. They believe in good and evil spirits, and that man is bound with and dependent of these forces. As with nature and its forces, Cvijić said that among Serbs "just as intimate and warm is the relationship with blood and historical ancestors" (Cvijić, 1987). This beliefs led to the development of rich customary practice, in which deep roots that originate from the old Slavic pagan religion can be seen. Even though Orthodox religion replaced it to the great extent, the reflection of it was preserved in the customary practice. Unfortunately, customary and ritual practices in contemporary society survived only in remote and isolated rural areas, mostly small villages in mountainous areas. Most vibrant, ritual and magical practices still maintain rural population of Eastern and South-Eastern Serbia (Vlach Magic, Prayer - St. George Feast, All Souls' Day, etc.).

Serbian humor. Humor is the state of spirit of the people, specific expression and the part of oral folk traditions and expressions, and as such reflects the character and mentality of the population who creates it. Cvijić found that in whole Serbia exists specific feeling of funny, mostly in connection with intelligent and delicate observation of human actions, with sharp observation of political acts and other groups and societies acting. Everything they do not like, they distort with a joke, humor and especially sneer and taunt. This state of mind has its specific expression in Era's humor that is the true social and cultural uniqueness of the people of this region, who humorously denounces all deviations of society, which is a true proof of the supremacy of the national spirit. Cvijić emphasizes

the specific kind of humor among people of Stari Vlah and Era's group of Dinaric psychological types (from Užice, in the south to the Zlatar Mountain and Lim River). "In Serbia became widely known Era's or Užice humor as some kind of a higher craftiness". Cvijić notes that Era's humor is more innocent than it is usually thought, and that it is usually outpouring of the toughness of national spirit. It is a contest of personal prevalence and clarity with someone else's inertia and dullness, with the main aim of outwitting an opponent (Cvijić, 1987; Nikolić, 2005). This characteristic was noticed by many travelers and explorers, and later with this "phenomenon" dealt a number of scholars and collectors of "Era's wisdom", "which adds to its importance, significance, tradition, creating a permanent mark on the cultural heritage of the Serbian people. Era's humor is recognized as part of the cultural identity of the Serbian people and since 2012 was listed in the National Register of Intangible Cultural Heritage of the Republic of Serbia.

Folk art. Traditional crafting and visual arts are essential representations that are reflected through the material culture of people and communities (Terzić et al., 2015). In particular, intangible heritage is not related to the production of material objects, but to the symbolism and the beauty of the crafting art in making specific handicraft products. Folk art encompasses various fields of artistic creativity: poetry, music, narrative, dance and fine arts activity, but at the end of the 19th century, products of the folk fine arts took the general name of "folk art". Creations of such a folk art are exhibited in forms, ornamental decorations of the surfaces, coloristic effects and figurative expression" (Petrović & Prošić-Dvornić, 1983). The authors dealing with folk art point out that it is essentially collective in the way in which it arises, because it is created with the rules and the canons of the community in which it is produced (Fileki, 2008). These objects are diverse, and are the part of traditional home furnishings, with primarily decorative character. Although some of it sporadically survived until today, these objects are not just decorations nor ethnographic artefacts, but they also point to a deeper meanings and have a specific importance in shaping the national identity of the Serbian people (Fileki, 2013). Cvijić (1987) finds that folk art in Serbia is rich and states: "Dinaric people have a sense for forms and our old ornaments are usually geometric in shape. The most beautiful carvings are made on the distaff, winches, tables, on gusle instruments, on the looms, etc.; these ornaments made in wood are mostly done in folk art. Quite interesting is the ornamentation made on carpets, national costumes, on the chest and sleeves of women's shirts, socks, and the ways in which folk foot-

wear "opanak" is intersected. However, the conclusion, on what is purely national in ornaments and how people borrowed and altered the foreign influences, cannot be drawn without the prior comparative ethnographic studies"(Cvijić, 1987, 265).

On contemporary list of representative Serbian intangible cultural heritage are included: Kosovo embroidery techniques, Pirot rug-making, making of wooden canteens in Pilica village, Pottery from Zlakusa village, Stone carving of rozette in Bele Vode village, and in the nomination process is the folk footwear "opanak" craft. All these items are created in the crafting process and are included in the handicraft category. They are characterized with stylized complex motifs and the reduction to the basic technique of crafting process. However, transmitting of traditional ornaments was retained to a certain extent. Thus, these objects today, visually, by techniques, materials and ornaments, do not differ much from the traditional craft items of Serbian rural population.

CONTEMPORARY LIST OF INTANGIBLE CULTURAL HERITAGE OF SERBIA

Intangible cultural heritage reflects national, ethnic and cultural identity as something unique and common for a nation. It is oral folk culture created in the ancient past and transferred through generations. Within Serbia exists a number of rituals, customs, skills and techniques of traditional products and gastronomic specialities that are the part of cultural heritage of Serbia and present national identity of the nations that live in Serbia (Terzić, 2015). This type of cultural heritage is internationally recognized by UNESCO through the adoption of the *Convention for the Safeguarding of Intangible Cultural Heritage* in 2003. Serbia ratified this *Convention* in 2010. The Ministry of Culture and Information formed a special network for the preservation of intangible cultural heritage (*National Committee for Intangible Cultural Heritage*) within the Ethnographic Museum in Belgrade in 2012. Twenty-seven nominations of intangible cultural assets were presented and placed in national register by the initiative and efforts of the *Centre for Intangible Cultural Heritage of Serbia* (Terzić et al., 2015).

"Intangible cultural heritage" presents the practices, representations, expressions, knowledge, skills, as well as the instruments, objects, artefacts and cultural spaces associated with it - that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, community groups constantly recreate, depending on their environment,

their interaction with nature and their history, giving them a sense of identity and continuity, thus promoting a respect for cultural diversity and human creativity. For the purposes of this Convention, it will only be taken into account intangible cultural heritage that is in conformity with applicable international legal instruments on human rights, as well as the need for mutual respect of communities, groups and individuals, and of sustainable development" (Law on Ratification of the Convention on the Safeguarding of the Intangible Cultural Heritage, Ministry of Culture of the Republic of Serbia, 2010). "Intangible cultural heritage" is manifested particularly in the following areas:

- Oral traditions and expressions, including language as a bearer of intangible cultural heritage;
- Performing arts;
- Social practices, rituals and festive events;
- Knowledge and practices concerning nature and the universe; and
- Skills related to traditional craftsmanship.

Among registered elements of Serbian intangible heritage in 2015 there are: Patron saint feast (krsna slava) (ratified by the UNESCO in 2014); The Prayer – St. George's ritual and traditional dish Belmuž (Knjaževac); Cheese and rugs from Pirot, storytelling from Pirot; Filigree craft-work (siversmith Krist Beriša from Kraljevo); Stonecraft in Bela Voda village; The ritual of casting and lighting of farmer's candles in Tronoša monastery; Custom of Lazarica in Sirinić region; Custom of the safeguarding of Christ's tomb (Batajnica); Kosovo embroidery technique (Leposavić); Singing with gusle instrument; Traditional folk round dance kolo; Folk dance Rumenka; Flute playing technique; Playing on the kaval instrument; Singing of short folk lyric song with 'oj' sound (ojkača); Singing by grunting (groktalica); Singing in a shout (Nova Varoš); Playing bagpipes; Town songs from Vranje; Era's jokes (Čajetina); Vuk's Parliament (Tršić); Pottery from Zlakusa (Čajetina); Naive art of Slovaks (Kovačica); Making of wooden canteens in Pilica village and traditional dish "mantije" from Novi Pazar (Centre for Intangible Cultural Heritage of Serbia, 2015).

However, the current UNESCO's concept of culture and cultural heritage protection insists on emphasizing, even producing a difference, and not (possible/potential) similarities and connections between cultures, which are considered to be completely separate and distinct entities. The pursuit of the Convention to such intangible cultural heritage protection is a living practice, in a way in which it works in local communities today.

However, we can see that among the intangible cultural heritage placed in the UNESCO's list as well as the national lists, there are many elements whose title "living" is problematic, or at least in the way they are presented. Additionally there are elements that are deemed unfit for entry to this list as they are in the conflict with the principles established by the relevant international legal instruments on human rights (eg. blood revenge, custom of selling of the bride in Serbian wedding customs, etc.). In fact, while various traditional technologies, as well as intangible heritage, which is related to lifestyles, is presented exactly as it is applied today in practice, folk elements are often packaged in a form that can be seen only within the tourist events, not in real, everyday's life (Gavrilović, 2011). Moreover, in the case of the protection of different traditions present in the Balkans that are naturally protected by the Convention by different ethnic states the problem of the implementation of the Convention is obvious. There is even the open confrontation in terms of usurping of certain folk practices, and striving for the delimitation of the principle of "what belongs to whom" and "whose is older", although the absolute limits in certain traditions can not be withdrawn.

What is evident in the practice, and in particularly in the recent initiative to create a national register of intangible cultural heritage, is to focus on the collection of data through the concrete initiative of individual institutions, associations, local communities and individuals who self-nominate certain elements of cultural heritage. It was noted that the process of registration of intangible cultural heritage of Serbia is currently in "cumulative" stage, where the initiative for recording of all forms of heritage that can be classified as "intangible" means making a list and supporting documents from the different parties, whereby this process is administratively very slow and limited. In addition, there is a tendency to nominate certain local specifics, and in doing so their overall importance is limited. In the tendency of getting the epithet of "national symbol" the geographical distribution of certain customs or practices, originality, tradition, symbolism, foreign influences etc. is overlooked. Dominant role in this process has the Centre for Intangible Cultural Heritage of Serbia within Ethnographic Museum in Belgrade, while other Institutes, regional and local ethnographic museums, cultural institutions and clubs so far have not shown sufficient interest and initiative to enhance this process. This is evidenced by the fact that the initial list with 28 elements of intangible cultural heritage of Serbia is formed in 2011, but until 2015 only one more element is added to the initial list (storytelling from Pirot).

CONCLUSIONS

If we compare the group of “spiritual” or “ethno-psychological” features of the Serbian people that Cvijić describes in his works, and have used them as a means of identifying specific regional types and varieties of people in the Balkans, we can see that he also defines some main groups of intangible heritage. It is done in much the same way as that UNESCO does almost 100 years later: language and oral traditions, customs and rituals, connection with nature and ancestors (knowledge and practices concerning nature and the universe), arts (performing as well as folk art in the form of the creation of artefacts and handicrafts - rug-making, pottery, folk costumes). Some key elements of Serbian intangible heritage Cvijić identified in his initial research: patron saint feast (slava), language and folk poetry, beliefs about the nature and spirits, as well as the customary practice for religious holidays (Christmas, Easter, St. George’s), Era’s jokes (as well as specific folk expression), artefacts acquired by traditional crafting technics (rugs (kilim), traditional costumes, peasant footwear “opanak”), etc. He also identifies the old traditional crafts in the extinction process.

This way Cvijić made a concrete contribution to not only to the ethnological and anthropogeographic knowledge at the time, but have influenced and provided the basis for future studies on various scientific disciplines (geography, ethnology, anthropology, archeology, sociology). Moreover, his multidisciplinary approach has a certain amount of modernity, as in the period when his outstanding research was undertaken, even today, this approach is considered the only proper way of scientific explanation and confirmation of certain social phenomena. Only with the in-depth research, documentation and presentation of intangible cultural heritage, in its traditional and contemporary forms, it is possible to ensure the preservation, without the canonization of the past and the formalization of the present. The point is to figure out the true meanings of customs, traditions and practices. This can be found through an exploration of their original traditional character, while preserving the tradition in modern conditions and current practices. This certainly requires a multidisciplinary approach and cooperation of a large number of scientific disciplines, as well as a large number of institutions and the entire Serbian public. An extensive effort is needed since the rich intangible heritage of Serbia still remains unrecorded, undetermined and certainly compromised by various external influences, political and global “fashion” trends.

ACKNOWLEDGMENT: The paper is supported by Ministry of Education, Science and Technological Development, Republic of Serbia (Grant III 47007).

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URBAN GEOGRAPHY IN SERBIA: FROM "VAROŠICA" TO CONURBATION

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ABSTRACT: It is right to say that the study of urban settlements in Serbia has a 200-year tradition, though it was initially merely descriptive. Cvijić's anthropogeographic concept of studying the *varoš* (and settlements in general) in the first decades of the 20th century laid the foundations of scientific geographical studies of cities and urbanization in Serbia. In a modern context, Cvijić's specific, integrated and synthetic approach to the study of settlements would be labelled as interdisciplinary and transdisciplinary. Modern urban geography in Serbia is based on unification and combination of explicative and applicative aspects of urban studies into a unique and complex geographical approach. The aim of this study is to analyze the achievements of the Serbian school of urban geography, from Cvijić's anthropogeographical concept until today. In addition to a general overview of the development of urban settlements in Serbia, the study seeks to identify current problems and drawbacks of modern studies in urban geography and to draw attention to the needs and the desirable direction of further urban research.

Key words: *varošica*, Jovan Cvijić, urbanization, city, conurbation

INTRODUCTION

The city is considered to be the greatest civilization's total creation and "the most complex human artifact" (Rykwert, 2000); it is characteristic of all cultural climates and almost all societies. The study of urban development is an interdisciplinary undertaking which takes into account philosophical, cultural, socio-economic and political concepts that accompany modern times and modern humans. This holistic and synthetic approach to the study of the city is not unknown to Serbian geographical school –

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it has its roots in Cvijić's anthropogeographic concept, which extended into settlement geography (urban geography), spatial planning and urban planning. The anthropogeography of the late 19th and early 20th centuries provided an essential framework for the understanding of geographical problems of settlements.

Although settlement geography was not a distinct scholarly discipline at the time, it developed within geography, as its integral part, along with the emergence of a geographical aspect in the study of settlements. Accordingly, the study of small towns (*varoši*) and cities did not exist beyond the general geographical study of settlements. It is right to say that the study of urban settlements in Serbia has a 200-year tradition, though it was merely descriptive at the beginning (Kojić, 1970; Stamenković, 2001). This paper seeks to examine the development of a geographical concept in to the study of cities in Serbia, parallelly with the development of urban settlements in its territory.

Problems related to terminology still persist in Serbian settlement geography, while some of the key concepts need to be redefined (Stamenković, 2005). They are often associated with defining criteria and, even more, with classifying criteria. The most general classification of settlements, accepted both in our country and in the rest of the world, is the division into villages and towns. Although these issues are not discussed in detail in this paper, it is important to define a conceptual and temporal starting point. The concept of the *varošica* determined the first higher level in the categorization of settlements in Serbia, in relation to the concept of the village. Accordingly, this review will begin with the "genesis" of the *varošica*.

THE FIRST SMALL TOWN

The famous ethnologist Milenko Filipović (1949) related that, at that time, in Serbia, "significant *varoši* (towns) were called cities, whereas smaller ones were called *varošice* (small towns)". The occupation of residents, their lifestyle, organization and a settlement's importance for traffic were the facts that determined its character – whether it was a village, a *varoš* (small town) or a city. The emergence of *varoši* (towns; units that comprised urban functions) or *varošice* (small towns) within villages is associated with this."

According to Milenko Filipović, the first reference to the *varošica* can be found in Vuk Karadžić's writings on Miloš Obrenović, first published in Russian in 1825; a Serbian edition was published in 1828. According to the

document, the seat of the rule of Milan and Miloš Obrenović was in Brusnica. When the Ottomans became the rulers of Serbia once again (1813) and when they erected their buildings in Brusnica, "it became similar to a small *varošica*," and the *müsellim* of *Rudnik* established his seat there. Accordingly, the embryo of the *varošica* took shape in Brusnica immediately after 1813, due to Turks, who built several urban-type houses and brought an urban style of life. In 1826, Brusnica had about 30 homes, the most of which were shops, the residence of *Oberknez* Jovan Obrenović, an unfinished chapel, a school, the local administration office of the *Rudnička Nahija* (Rudnik district), and the home of the Ottoman *müsellim*. It existed and developed as a market and administrative center of *Rudnička Nahija* until 1856, when the *varošica* was moved to a more suitable location, downhill, by the Despotovica River. It was at first named Despotovica, and since 1859 it has been known as Gornji Milanovac. The transfer of the institutions from Brusnica to Gornji Milanovac proceeded gradually. While the "Brusnica varoš" had been located within the Brusnica village and had had a central position in relation to other parts of the village, Gornji Milanovac developed on the periphery of the area of the Brusnica village, at a place that had a favorable position, compared to other villages and the entire region, within which it became an administrative and economic center. Accordingly, Brusnica is the oldest known "varoš within a village" in Serbia and the development of such *varošice* was not prior to the beginning of the 19th century (Filipović, 1949).

Filipović (1949) further emphasizes that though a favorable transportation position was very important, the social, economic and cultural development of the village, along with social differentiation, were more important factors for the rise and development of the *varošica*. The same applies to Brusnica, because it was founded by the Obrenović family, as traders and government officials, along with townsfolk (Turks and craftsmen). Individuals and whole families involved in trade, crafts and public services, still moved from villages to *varošice* and by changing their vocation, they changed their lifestyle, i.e. adopted an urban way of life.

Unlike Šumadija and Western Serbia, in Vojvodina the term *varoš* designated the central part of a village, where a church, schools, local administration, shops, crafts were concentrated, and where an urban lifestyle prevailed. In Bosnia, during the Ottoman period, cities with combined Oriental and Balkan traits developed in which *čaršija* (bazaar – the central business area); *mahala*, which surrounded the bazaar and was inhabited by Muslims; and the *varoš* on the periphery, where Christians lived, could be distinguished (Filipović, 1949).

THE ANTHROPOGEOGRAPHIC METHOD AND CVIJIĆ'S CONCEPTS OF VAROŠI AND CITIES

As far as locations and types of settlements in the Balkan Peninsula are concerned, Cvijić (1922) notes that "there is no favorable location for human life and work that has not already been discovered and where a settlement has not been established. People have always grouped around certain points and areas of attraction, forming initially a small core, around which other population layers have assembled. Once assembled, people use their intelligence and work to improve and increase natural resources, thereby raising the value of the geographical location of a place and a region. This attracts others who want to use both the natural resources and the added value of the geographical position. In that way, human agglomerations grow and thrive." These laws and principles are still valid and they have a universal value in perceiving and analyzing the process of urban concentration of population and their activities in space.

Relying on the genetic method, Cvijić also emphasizes various attributes that determine the position and development of *varoši* and cities, on the one hand, and villages on the other "because *varoši* are settlements of a higher rank and they are an indicator of a higher civilization, while villages are simpler settlement units" (Cvijić, 1922). Direct observation in field settings and deeper reconsideration without much schematizing were the key methods on which Cvijić's knowledge and results were based (Grčić, 2003). Having in mind the importance of settlements, *varoši* and *varošice* are analyzed in a wider social, geographical, historical, economic and cultural context, while in the study of villages it is crucial to examine the local land and economic conditions on site (Cvijić, 1922). There has been no scholar either before Cvijić or after him who "has demonstrated the full cognitive value of the typological approach to socio-cultural phenomena better than him" (Mitrović, 1999).

Cvijić placed anthropogeographic phenomena, including settlements, in historico-genetic frameworks, taking a deep insight into their physico-geographical, philosophical and sociological aspects (Grčić, 2003). In all periods, the position of the *varoši* of the Balkan Peninsula was decisively determined by the processes of fusion and permeation. In addition to the physico-geographical factors of settlements' localization, Cvijić also discussed their further transformations, influenced by civilizational, historical, political, economic and ethno-psychological factors. Changes occurred in the size, physiognomy, and function of settlements, population structures, migrations and lifestyle. He also wrote about the

transformations of traditional Balkan types of the *varoš* under Western influences. Regardless of the central subjects of research and spatial coverage, today's urban geography analyzes the same factors and elements of urban change that were empirically identified by Cvijić. This also reflects the relevance of his approach to the study of cities and the large scope of his work, essentially intellectual, imaginative and geographical.

Nedeljković (1982) points out that the essence of anthropogeography rests in the fact that it grasps into natural and social sciences in an equally complex and radical manner. According to Grčić (2003), Cvijić's anthropogeographic method is a combination of methods used in natural sciences (Erdeljanović, 1927) and sociological methods (Kostić, 1965; Ćulibrk, 1982), while his genetic method was shaped under the influence of positivist philosophy and real humanism. One of the underlying principles of his anthropogeographical views is the understanding of the organic connection among all aspects of life and their close relationship with the geographic environment. This is, however, far from geographical determinism and is in essence closer to the modern ideas of human ecology (Grčić, 2003).

Anthropogeography and urban planning

The architect Branislav Kojić (1970, 1982) noted down that anthropogeography provided a solid foundation for any study of settlements, including the study of urban planning. In terms of subject matter and methodology, anthropogeography took shape in the late 19th century and was soon to yield important scientific results. Quite oppositely, urban planning was merely taking shape and carving its path in those days. Anthropogeography aims to present the current situation and explain the genesis and development of settlements, while urban planning aims at channeling their further development and therefore requires a greater use of quantitative indicators, statistical analyses and typologies (Kojić, 1982).

After the Vuk Karadžić's early attempts to describe *varoši* (towns) and *varošice* (small towns) in Serbia and Karić's functional classification and overview of the structure of urban settlements, the first scholarly analysis and picture of *varoši* and *varošice* was given by Jovan Cvijić in *Anthropogeographic problems* (1902). Over the following twenty years, until the publication of *The Balkan Peninsula* (1922), he sought to fill in the gaps in the study of settlements. However, the issue of urban settlements, unlike the issue of rural settlements, was subject to almost no serious changes or revisions: the same number of types remained with a somewhat changed terminology. Although this was a complex task, the facts that he modest-

ly described as merely *observations* persisted as facts in which there was little to change. Cvijić's works lack the following elements of the content and structure of settlements: the population size, the population density, land use, infrastructure, the units of the settlement system, the functional classification of villages, the phenomenon of the rural *varošica* (a unit comprising urban functions within a village) and the rural *čaršija* (bazaar). Nevertheless, Cvijić analyzed urban problems in a general and integrated manner. If we sought to make an overall assessment of the importance of Cvijić's work in the body of knowledge on the *varoš* and the village, we could indisputably conclude that all of the basic theses of Jovan Cvijić have still retained their scientific value (Kojić, 1982).

After 1925, anthropogeographical monographs on *varoši* and *varošice* were published increasingly often, while the first studies on urban planning appeared only shortly before World War II. The first study, *Urbanism in Serbia*, was written by Branko Maksimović in 1938. In 1941, Branislav Kojić published the study *The Architecture of Villages in Šumadija and Pomoravlje*. Along with partial monographs and tentative thematic discussions and reviews (Kojić, 1982), there have remained major problems related to (re) defining urban settlements and the appropriate terminology and typology (Stamenković, 2005), but also to the need for an integrated approach to the settlement geography, which imposes itself as an imperative.

PERIODIZATION AND CLASSIFICATION OF URBAN SETTLEMENTS IN SERBIA

In the development of Balkan urban settlements, the architect Branislav Kojić (1976) distinguished the Roman, Byzantine and Slavic periods (between the third and fifteenth centuries), the Ottoman period (15th–19th centuries) and the age of new Christian states and the transformation of the Balkan city into the European city.

The period from 1815, when the modern Serbian state became autonomous, to 1914, when World War I began, can be divided into several phases. In the first phase (1815–33), the continuity and the situation inherited from the Ottoman period were maintained. At that time, it was possible to distinguish among cities, *varoši* (towns), *varošice* (small towns, including – *varošice proper, palanke, kasabe*)¹, villages and hamlets. In the

1 *Kasaba* designated a small town (*varoš*), similar to today's rural small towns (*seoske varošice*) - centers that perform administrative, traffic and economic functions for several rural settlements. The term *palanka* had several meanings: this type of settlements emerged as military fortifications whose purpose was to protect transport. Vuk

second phase (1833–1878), with the implementation of the Hatt-i sharif of 1833, which granted autonomy to Serbia – peasants became the owners of land, the Turks were leaving cities, while Serbian rural population were gradually settling in them, as a new bourgeois class with their own ideas of economy, cultural needs, the organization of housing, etc. The settlement system was simplified by reducing settlement types in the middle categories to *varoši* (towns), *varošice* (small towns) and villages (Law on district towns, *varošice* and villages in Serbia of 1866). The third phase (1878–1915) was characterized by a definite abandonment of Oriental legacy, Balkan urban planning and architecture and a shift towards Western civilization and Central European urban planning models. Cities and *varoši* were transformed and redesigned, along with *varošice*, whose number was rapidly growing. From the moment when national independence was gained in 1878, *varošica* began to change intensively. At the end of that phase its evolution ended and it lost the intermediary function between the village and the city (Kojić, 1970).

In the 19th century, in Serbia, *varošica* was an urban-type settlement, a boundary category between urban and rural settlement categories and an intermediary between villages and towns in the settlement system. The most important criteria in determining *varošice* in Serbia were their functions in the settlement system, especially the external ones (administrative, judicial, health, education, technical services for the needs of villages, trade, artisan production for rural households and the function of a traffic hub – postal services, transport, etc.). A *varošica* did not have its own internal functions (industry, a military garrison, cultural institutions) and it would cease to exist if its external functions on which a relationships between villages and towns rested were abolished. It was inhabited by clerks, merchants and craftsmen, who endowed the settlement with an urban character, and farmers. What also distinguished the *varošica* from other types of settlements were its legal and commercial functions, as well as the lifestyle (housing culture, work organization, clothing, nutrition, etc.). However, the designation of settlements as *varošica* was done by an administrative act, decree, whereas the criteria and classifications were often undefined and incorrect. The concept of the 19th-century *varošica* was embodied in the terms *varošica* and *palanka*. In the Law on inhabited places (*Zakon o mestima*, 1866), the *varošica* remained an official category, while *palanka* eventually acquired an even pejorative meaning. Kojić (1970) concluded that 41% of *varošice* in Serbia at the beginning of the 20th century

Karadžić noted that *palankas* were smaller than many villages, but in them Turks were stationed and they had their houses in the vicinity of these settlements.

(1910) had developed from the *varošice* shaped during the Ottoman period, 21% emerged as new settlements next to an already existing village, 20% were a result of the transformation of villages into *varošice*, whereas 18% were created as new settlements in previously unpopulated areas.

After World War I, *varošica* gradually changed its functions due to the transformation into a settlement with its own growing internal functions: the development of industry, artisan production, tertiary services, cultural institutions. The former role of an economic, administrative and cultural center for a number of villages was taken over by a new member in the settlement system – the rural *varošica*, whereas the *varošica* that had been developed in the previous period gradually transformed in the settlement of a higher category (Kojić, 1970).

In his geographical and statistical description of Serbia published in 1827, in the section titled “Cities and *varoši*”, Vuk Stefanović Karadžić was the first to offer the classification of settlements in the restored Serbia and describe their basic characteristics. Scholarly descriptions of settlements in the mid-19th century can also be found in the works of Milan Đ. Milićević – *The Principality of Serbia* and *The Kingdom of Serbia*, and Vladimir Karić – *The Kingdom of Serbia*. They were followed by the systematic work of Jovan Cvijić dedicated to the settlements of the Balkan Peninsula (1902 and 1922) (Kojić, 1970) and the transition from descriptive to scientific (explicative) geography (Ćirić, 1966). As far as the period after World War I is concerned, Kojić (1970) notes that it was the time when an important activity of Serbian geographers on the monographic study of a large number of towns in Serbia was initiated.

Statistics, as well as geographical and demographic science, distinguish two basic categories in the settlement system: the village and the city, while urban planning distinguishes a greater number of hierarchically ordered categories. The categorization of a single settlement is done based on the following basic criteria: the functions of a settlement in the settlement system, the number of residents, the types of their occupation, development density, population density, the legal privileges and lifestyle of residents.

In Central Serbia, in the group of urban settlements, Kojić (1973) distinguished three main categories: cities, *varoši* (towns) and *varošice* (small towns). In a more detailed context one could also speak of additional variants: a small city close to a large town, a small town, a developed small town, etc. They differed in functional, urban and size characteristics. Cities were the highest category in the settlement system and their external functions extended over a considerable territory. The highest

rank institutions of tertiary services were concentrated in cities. Cities were also important traffic hubs. Manufacturing industry companies were located there – accordingly, cities were centers of secondary activities as well. In Serbia, only Belgrade was beyond the scope of “normal” cities and belonged to a special category – the metropolis category, with a number of satellite *varoši* (towns) and *varošica* (small towns). The *varoš* had a high rank in the settlement system. It was the seat of educational, health, technical and other institutions, whose functions extended over broad territories and settlements of lower categories. In Serbia, the area over which the functions of towns extended was about 2,000 km². *Varošice* (small towns) were urban settlements, with small, limited, external functions intended primarily for nearby villages. Their functions extended over a territory of about 500 km² (Kojić, 1973).

Kojić (1973) pointed out that various terms that indicated the emergence of a large number of settlements in a relatively small area were used in the literature in Western countries, especially in the United States. These included *conurbation*, *regional towns*, *megalopolises* etc. Essentially, they were all settlement systems because their territory comprised – along with big cities – a number of smaller cities, towns (*varošice*), villages and hamlets, with plenty of green undeveloped areas in which settlement units could be distinguished.

In an evolutionary perspective, from the emergence of the earliest human settlements, to their modern forms, Stamenković (2007) distinguished: rural settlements, mixed settlements, urban settlements, metropolises, conurbations, megalopolises and the Ecumenopolis (the City of the Future).

Due to an inadequate and often variable typology of settlements in Serbia, the problem of defining urban settlements has long remained topical and unresolved in the national statistics. The division of settlements into three types – urban, rural and mixed (a transitional form between the rural and urban types) – defined by Miloš Macura (1954) had been applied in the population censuses of 1953, 1961 and 1971, after which it was abandoned. Since the census of 1981, settlements have been classified as *urban* and *other*, using legal and administrative criteria. A settlement is designated as a town by the decision of municipal authorities and an appropriate legal act (published in the Official Gazette of the Socialist Republic of Serbia). According to new criteria, the concept of the city is very wide, which makes it possible to cover by this term a range of very different settlements (in terms of population, functions, importance). The settlements that are not designated as a urban, are considered rural (marked as “other” settlements). Despite new efforts to solve these inaccuracies

(Jovanović et al., 1988), the issue has remained open and the disparity of criteria defined in 1981 has persisted, as well as the non-compliance with the criteria of European countries and the limited usability, comparability and reliability of data about our settlements. A new, reliable typology of settlements should be based on functional and demographic indicators because they can objectively represent the importance of a settlement within an area (Stamenković, 2005).

The period after World War II, until 1991, was a phase of intense change in the settlement system of Serbia, which was associated with industrialization and the resulting processes of urbanization, polarization and deagrarianization. The phenomenon of industrialization certainly had a primary importance because it was the main agent of urban development and transformation of the environment (Stamenković, 1992; 2001b). The cities of this period were marked by rapid functional changes², accompanied with social changes, as well as with significantly slower morphological changes in the city area (Tošić, 2007). A growing number of settlements was granted the status of the city. Along with a constant increase in the number of inhabitants, the territory of cities, including the surrounding villages, expanded. That period was marked by the reconstruction of central urban areas, construction of new residential blocks, industrial districts, trading facilities, restaurants, academic and health facilities, recreational venues, hotels, but that was also a period when the lifestyle was changing (Savić, 1988).

Contemporary problems of urban settlements in Serbia

Urbanization is a complex process of the emergence and development of cities and other urban areas that have the characteristic of a city (Stamenković, 2005). At the same time, it is one of the earliest global processes. The clustering of cities and the formation of the so-called "mega cities" (megalopolises) are natural consequences of the progress of global civilization. Thanks to their external economies, large cities attract new business, industry, commerce, educational, scientific, financial and other complexes (Grčić & Sluka, 2006). A spatial and demographic imbalance and significant disproportions in the concentration of population and the degree of socio-economic development have long been present in the settlement network in Serbia (Stamenković, 2005). The year of 1991 is considered to be a historical turning point in the development of urbanization in Serbia:

² The functional transformations of cities in this period were often the consequences of external political intervention, state-directed building of industrial capacities so that every region may get something, regardless of the local conditions (Tošić, B. 2007).

in 1991, more than a half of the total population lived in urban settlements (50.7%), while in 2011, the share of urban population reached 59.4%³.

The industrialization and urbanization processes encouraged the concentration of population and activities in centers, which, being the nuclei of growth, led to an even more pronounced polarization in the settlement network (Tošić et al., 2004). The internal structure of Serbian cities shares the characteristics of other post-socialist cities, but these changes became manifest a little later and they did not lead towards the development of typically capitalist cities (Tosich, 2005) but rather towards the formation of the transition or the post-transition model typical of Central, Eastern and Southeastern Europe. The changes include the emergence of abandoned industrial sites, the commercialization of historical city cores, the growth of the service sector, the reurbanization and revitalization of individual parts of the city, housing and communal suburbanization (Tošić, 2006). In recent times, cities are witnessing the processes of tertiarization and quaternarization of economic activities, associated with the dominant development of the services sector. Industrial activities are significantly reduced, which particularly affects medium and small cities which are mainly monofunctional in character, with large industrial facilities, which have experienced a collapse in production and employment. In spatial terms, de-industrialization has led to the formation of relatively large abandoned industrial zones, the so-called brownfields. These areas, with all of the already existing buildings, are waiting to be assigned a new purpose. At more attractive traffic locations in cities, particularly along beltways, private-sector facilities are being constructed in considerable number. In addition to that, new production sites with well-equipped infrastructure have been formed – the so-called greenfields, which are attractive for new investors who seek to build primarily small-scale industrial capacities (Tošić, 2007). Along with social polarization, there are also changes in the residential area of the city (segregation, gentrification and population filtration according to the socio-economic status, etc.) (Grčić & Sluka, 2006; Todorić & Ratkaj, 2011). The construction of individual houses at the urban edges is also the characteristic of Serbian cities; it is often illegal and associated with sudden repurposing of agricultural land as construction land.

In the postwar period, urbanization in Serbia was accompanied with the emergence of urban agglomerations (by joining suburban areas

3 According to the first population census in the Principality of Serbia in 1834, only 6.5% of the population lived in urban areas. In the early 20th century, the share of urban population increased slightly to 13.1%.

with the central city) and conurbations (by coalescence of nearby urban settlements). Compared to the same processes in large countries, these phenomena were miniature in scope. Marković (1977) reported a case of a conurbation in the joining of Belgrade (in Šumadija), and Zemun (in Srem), achieved by the construction of New Belgrade. Mladenovac, Lazarevac and Obrenovac were joined to this conurbation and there was a possibility of connecting it with Pančevo by building settlements on the Banat side of Belgrade. According to him, it was possible to expect the joining of Belgrade and Novi Sad in Srem, through four neighboring urban settlements: Inđija, Stara Pazova, Nova Pazova and Batajnica (already connected to Zemun). If the conurbation of Novi Sad grew together with the conurbation of Belgrade, and the latter was joined with the conurbation of Smederevo and Požarevac, that would result in a conurbation-megalopolis with approximately two million residents and reaching 120 km in diameter. The author also discussed three cities in the Velika Morava basin as a likely conurbation: Jagodina, Čuprija and Paraćin, located within a distance of only 18 km, which cooperated and had an inter-municipal council, common economic organizations, institutions, functions. This closely tied urban whole had a population of about 100,000 people, and if they had a tendency to merge, it would be realistic to expect the rise of a conurbation. With its central placement, Čuprija was predestined for a central function, but was limited by the narrowing of the northern (toward Jagodina) and southern gravitational spheres (toward Paraćin). According to Marković (1977), the conurbation would be created faster if development activities were directed towards bringing the settlements closer.

URBAN GEOGRAPHY IN SERBIA

Settlements geography is considered to be the first geographic school in Serbia. It has existed as a disciplined based on scholarly methods for more than a century. Its initial scientific foundations were laid in the late 19th century. Since then, it has passed through two main phases: 1) a phase of the integrated development within antropogeography, until the beginning of the 1970s, and 2) a phase of independent development, since 1971, when it was first mentioned as an independent discipline in an academic curriculum. From the formation period until the present day, settlement geography has developed along two main directions: the explicative and the applicative (Stamenković, 2001a).

Urban geography is a young geographical discipline undergoing an intensive development. It is a compatible segment of settlement geogra-

phy but it is gradually becoming independent due to divergent processes within settlement geography. Within geographical science, urban geography is distinguished by the subject of its research, an original methodology and the applicability articulated through spatial, regional, urban and rural planning. All factors that determine the place and role of urban geography within geographical science arise from the nature of urban geographic phenomena and processes, namely from their chorological and chronological actualizations manifested through the economic, demographic, spatial, functional, morpho-physiognomical development of cities, urban regions, agglomerations, urban systems, and the globalization of urban processes (Tošić, 2007). A general overview of these dimensions of the development of cities was offered already by Cvijić. In the system of geographical sciences, urban geography has an integrative role and it is through it that the links between geography and other sciences (law, sociology, economy, ecology) that study urbanization are being established. This strengthens its integrating role in the system of sciences.

The interest of Yugoslav geographers in the study of cities was particularly pronounced after World War II and it accompanied the intensive urbanization of the country. At that time, a large number of studies appeared which sought to determine and study the problems of urbanization and urban development from various standpoints and using different theoretical and methodological approaches. They can be divided into several groups: theoretical and methodological monographic studies of individual cities; studies on settlement networks; studies on urban functions, and studies on the functional relationships and connections between cities and their environment. In the first phase, the most significant works included the studies of O. Savić, S. Žuljić, V. Rogić, V. Đurić, J. Marković, J. Ilić, M. Bjevitić, B. Bukurov, M. Pak, I. Vrišer, M. Panov, M. Mišković and others. An especially strong impetus to the development of urban geography was given by two Yugoslav symposia dealing with urban geographical processes (Ljubljana, 1970 and 1979).

The modern period of the development of urban geography, which coincided with that phase in the development of human geography when accent was laid on functions and processes, was characterized by new concepts, according to which the city was seen as the most dynamic category of geospace. This systematic approach to the study of urbanization and the city yielded numerous papers and two university textbooks titled *Urban geography* (by M. Vresk and I. Vrišer). In Serbian urban geography, the phase when the focus was on functions and processes began with the study of J. Ilić *Characteristics of the functional relationships between the city and its*

environment with special reference to the Socialist Republic of Serbia (1970). It was followed by numerous works by other authors, among which the papers written by A. Veljković, M. Grčić, S. Ćurčić and J. Ćirić stand out. In these papers, urban geography is observed from various standpoints. The studies of A. Veljković, which introduced numerous quantitative methods and the principle of exactness in Serbian urban geography, are particularly noteworthy. Apart from them, the studies of D. Perišić, which are fundamental for the application of urban geography in spatial planning (Perišić, 1985), stand out within urban geography (Tošić, 2007).

The 1990s are characterized by two groups of works: 1) A. Veljković and associates, *Serbian cities – centers of development in the settlement network* (Veljković, Jovanović & Tošić, 1995), where cities are viewed as poles or centers of growth and development; and 2) S. Stamenković *Commuting of labor force and school children to central settlements in the area of Vranje* (Stamenković, 1989) and *Commuting (of workforce and students) to Aleksandrovac and Brus* (Stamenković, Pavlović, Tošić & Milinčić, 1995), dealing with the spatial and functional relationships of the city and its surroundings by identifying rules in the development of daily urban systems. Along with the development of research, university textbooks were also published – *The geography of settlements* by S. Stamenković and M. Bačević (1992) in Belgrade, and the eponymous textbook by S. Ćurčić in Novi Sad. They largely sublimated the research results of international and local researchers into urban geography. In a specific way, the textbook by Stamenković and Bačević intertwines and combines the results of Cvijić's anthropogeographical approach to the study of settlements and the modern approach focused on functions and processes (Tošić, 2007).

CONCLUSION

The development of urban forms of settlement in Serbia over the past two hundred years has been a product of external (political, administrative, economic, global, etc.) factors (Ottoman rule, liberation, wars, socialist planning, European and global trends, etc.) rather than a result of the human urge to organize the urban life according to the needs of its inhabitants. The question to what extent the modern city is dehumanized, alienated and inhospitable towards its inhabitants will remain. In this respect, a resort to human geography would be a qualitative leap in our perception of the world. Geographers have an important task of maintaining the tradition of Serbian human geography (the geography of man), because in the future, it is expected to gain in importance. Serbian geographical school develops

in the right direction thanks to the founders of geographical thought. However, in the modern world, tradition is not a substantial resource for the general, especially human development.

Although it has passed through various stages of development, today's urban geography is still conceptually inseparable from anthropogeography. The scientific foundations of urban geography are rooted in Cvijić's general and explicative analysis of the problems related to Balkan towns (*varoši*) and cities. Although merely generally, Cvijić included all of the key attributes of urban development – from the genesis of cities, very often at sites geographically predestined for the formation of settlements and agglomeration of people and their activities within an area, to the way of life in towns (*varoši*), as well as social, economic and ecological attributes of urban life – in his capital work *The Balkan Peninsula*. The legacy of Cvijić's approach and his "school" in the study of cities have been the basis for further studies of urban forms in Serbia, from geographical to architectural and urban sciences. All of the key problems of urban settlements observed and discussed by Cvijić remain the general basis for further studies. From the modern perspective, his perception of urban settlements and lifestyles could be subsumed under human ecology. His approach was basically possibilistic and behavioral. In the West, urban social geography deals with the same issues and even its perspective is not much different from Cvijić's, though the capitalist economy, liberal policies and the global urbanization have left their imprint on urban socioeconomic problems.

It is indisputable that the Serbian geographical school reached the essence of the geographical approach to the study of the city (from rural towns to agglomerations and conurbations) in Cvijić's anthropogeographical school. It managed to draw attention to the qualitative dimension of urban life and explain the rhythm, cultural infrastructure, and the essential meaning of the term – city. The essence of the geographical understanding of the world is reached in the anthropogeographical synthesis. Although specialization is a natural and logical way of deepening research and research subjects, the breadth of the geographical idea of the world, intuition, intellect and imagination in empirical geographical studies belong to the legacy of Jovan Cvijić and they should remain the postulates of all geographical studies, including urban studies.

Therefore, studies in urban geography should maintain the spirit of Cvijić's anthropogeographical school. Additional quantitative indicators, statistical analyses and typologies should certainly be included but they are only to "fill in the gaps in the fabric", as suggested by Jovan Cvijić. Whether we have succeeded in this, remains for future generations of

geographers, spatial planners and colleagues from related disciplines to judge.

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ETHNOLOGY



JOVAN CVIJIĆ'S PSYCHOLOGICAL CHARACTERISTICS OF SOUTHERN SLAVS AND "ETHNOPSCHOLOGY" IN SERBIA*

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ABSTRACT: The chosen subject of our analysis is Cvijić's key anthropological and ethnological study "Psychological Characteristics of Southern Slavs". The research focuses on Jovan Cvijić's not only explicitly stated, but also implied scientific views. One part of the analysis reveals the dominant scientific paradigm of Cvijić's age – the prevailing ethnological theory and the methodology of scientific research, as well as stylistic features of scientific expounding, including the misconceptions of science of his day, prejudices or manners shared by Cvijić and his contemporaries, all of which were, to a certain degree, conditioned both by the social occurrences and the dominant ideology of that period. It also recognizes Cvijić's original contribution and insights later reached by cultural and psychological anthropologies. Additionally, this paper analyses the reception of Cvijić's ethnological work, thereby reaching the conclusion that determining the contextualization and intertextuality of the scientific text represents a way to render a more objective evaluation of Cvijić's ethnopsychological research. The conclusion is reached that the reception of Cvijić's work by the subsequent generations of ethnologists and anthropologists has been conditioned by the role of Cvijić as a "triple symbol" of its own kind, thus diminishing the possibility of making a more objective appraisal of his role and significance.

Key words: Jovan Cvijić, ethnopsychology, psychological and cultural anthropology, scientific discourse, reception of scientific work.

* The text is a result of the work on the project No. 47016: *Interdisciplinary Research of the Cultural and Linguistic Heritage of Serbia. Creation of Multimedia Web Portal "The Lexicon of Serbian Culture"*, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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INTRODUCTION

Especially nurture within you repugnance for political trifles and infamies
(Jovan Cvijić in his letter to Petar Kočić of August the 16 1909)

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Cvijić's extensive scientific oeuvre was marked by an interdisciplinary approach. Apart from the geographical research of the Balkan Peninsula, Cvijić carried out the ethnological study of the Balkan population, migration, settlements, economic activities, and made an attempt to determine the cultural belts and psychological types and varieties of Southern Slavs, all of which make an important part of his scientific work. He also played the key role in establishing ethnology as an academic discipline in Serbia¹, and can be considered the founder of science-based ethnographic description. Cvijić is credited with founding our anthropogeography and introducing fresh methodological procedures. Owing to him, *Serbian Ethnographic Journal*, a collection of ethnographic descriptions and ethnological essays, was started (Prelić, 2014; Radojičić, 2014). However, Cvijić's anthropogeographical school was extinguished, whereas the evaluation of his scientific oeuvre became, to put it mildly, ambivalent. His key work *The Balkan Peninsula (La Peninsule Balkanique: Geographie Humaine)*, which contains the determination of the cultural belts and the classification of psychological types of Southern Slavs, emerged as the subject of re-evaluation of not only Cvijić's role and significance, but also the directions of the development of Serbian ethnology and anthropology, thus becoming the battlefield of scientific-ideological confrontation.

In accordance with the stance that scientific theory and methodology, as well as the dominant language and style of a scientific text, are products of history, and which, apart from being scientific input in their own right, reflect dominant social discourses representing at the same time an integral part of a world view of a certain epoch, our reading of Cvijić's *Psychological Characteristics of Southern Slavs* seeks to establish the historical context of the work's emergence and perception, in order to avoid the dangers of interpretative anachronism and the ideologization of

1 The assertion that Cvijić is *the founder of Serbian science of peoples*, stated by Jovan Erdeljanović (Erdeljanović, 1927) could also have its justification in the fact that Cvijić founded the Department of Ethnology in 1906. Numerous significant ethnographers and ethnologists, such as Jovan Erdeljanović and Tihomir Đorđević, stemmed from Cvijić's anthropogeographical school; from the ethnography course Cvijić held at Belgrade Higher School, ethnology started its development as a scientific and academic discipline in Serbia.

science, and come to a realistic assessment of Cvijić's contribution to the development of ethnology and ethnopsychological topics in Serbia.

The determination of contextualism and intertextuality of the scientific text represents a way to a more objective assessment of Cvijić's ethnopsychological research – which includes the recognition of those features representing the common properties of scientific discourse of his age, that is – the ethnological/anthropological theory and methodology of scientific research of that time, along with stylistic features of scientific expounding, including the misconceptions of science, prejudices or manners shared by Cvijić and his contemporaries, and his original scientific input. Comparing scientific texts to the system of values and beliefs of one era, and perceiving the correspondence between them and certain social and political theories is a legitimate way of their analysis and evaluation, but in doing so one should separate the scientific from wide-ranging social activity of the author. Reading elements of the author's private ideology into his scientific work, or elements of the ideology of his time, even of his extensive social engagement² where they are neither explicitly nor implicitly present, cannot be considered an acceptable way of interpreting his scientific work.

THE RECEPTION OF CVIJIĆ'S ETHNOLOGICAL STUDY

After World War Two, Cvijić's anthropogeographical research was almost completely marginalized, especially his ethnopsychological work (Jovanović, 1992: 15–18). The Bulgarians A. Beshkov, Lj. Dinev & Z. Borisov called Cvijić "the flaunting Greater Serbian chauvinist", whereas Dinko Tomašević in his book *Political Development of Croats* refers to Cvijić as "a prominent theorist of Serbian expansionism" who is trying to prove the superiority of the Dinaric race. H. Islami and R. Ismaili, critics from Kosovo, considered Cvijić preoccupied with political interests of Greater Serbian bourgeoisie. The condemnations of Cvijić's "Psychological Types" came from the communist circles as well: since there was not any class framework in his typology, he was accused to have written from "the bourgeois stance". Cvijić was castigated for racism and chauvinism, although Dvorniković held it against him that "the Dinaric type is not racially determined" and Gezeman set out

2 In addition to acknowledging Cvijić's scientific input, Bojan Jovanović also describes Cvijić as a geopolitician: "The founder of our ethnopsychology and the scholar of South Slavic psychological types was also a geopolitician and an architect of a new psychological type within the framework of the idea and concept of Yugoslavism (Jovanović, 2008: 54).

to prove that Cvijić's "Dinaric type" did not have a racial meaning, but that it was primarily "a sociological and socio-psychological notion" (for more, Džadžić, 1988, 192–261). In the period after the disintegration of Yugoslavia, Cvijić was criticized for sacrificing scientific objectivity for the sake of a political agenda, Greater Serbia ideas were imputed to him, and his ethnological work was considered as an attempt to justify Serbian claims on the Vardar Macedonia (White, 1999, 237–242), despite the fact that Cvijić advocated the thesis of the existence of the Macedonian people. Even today, especially among "the third generation" of Serbian anthropologists, there are views that Cvijić's ethnology is ethnocentric and "fundamentally concerned with the questions of ethnic borders, the origin and migrations of population, therefore, almost completely designed to study 'Serbs outside Serbia'" (Milenković, 2010, 64). From time to time, distancing oneself from Cvijić takes the form of a manifesto, while Cvijić's legacy is implicitly assessed as essentialist, nationalistic and racist.³

Marko Pišev, who also belongs to "the third generation", denotes Cvijić as the bearer of the Greater Serbia idea disguised as Yugoslavism, pointing out his political role and influence, and calling him a "double" and "triple insider", explaining that the crucial property of a double insider is the identification of a researcher with the studied subject (Pišev, 2010, 71). Particularly emphasizing that Cvijić accentuated as the three constituents of the Serbian soul "its traditional missionary character", "its double nature (hero / revolutionary, martyr / sufferer)", "its church" (Ibid.), without a more precise citing of facts which support his claim that Cvijić identifies himself with the studied subject, Pišev thinks that "we can suppose yet something else: namely, if missionary nature is a constituent of this collective soul, then Cvijić could also be represented as a scientist-missionary⁴, while his mission would, by the same token,

3 "Since I belong to the third generation of university professors who do not think that the primary goal of ethnology and anthropology is the search for pseudo-scientific evidence, it is my honour to confirm that there are already numerous generations of ethnology and anthropology students who do not learn, mostly do not believe, and, most importantly, in their public professional work, do not propagate ideas Jovan Cvijić once set for the discipline and, in general, for social studies and humanities in Serbia. [...] The analysis of the transformation of syllabuses indicates a stable turn towards anti-essentialism and anti-nationalism, therefore, a general anti-racist tendency [...]" (Milenković, 2010: 13–14).

4 In order to prove his thesis of Cvijić as a scientist-missionary, Pišev cites Cvijić's speeches and articles. The only bibliographic unit which contains Cvijić's quotations in this text is: Cvijić Jovan. 2000. *Sabrana dela 3* (vol.1), *Govori i članci*. Beograd SANU – Zavod za udžbenike i nastavna sredstva. Making far-reaching conclusions about Cvijić's complete scientific achievement based on one segment of one of his works,

mean science in service of full realization of Serbian hegemonic agenda" (Ibid.)⁵

Ivan Kovačević's approach is much more objective. Kovačević chiefly criticizes Cvijić for the insufficient definition of the term "psychological type", yet, he notices that it does not correspond to the term "ethnic group", as M. Filipović tried to interpret it. Kovačević emphasizes that Cvijić and the representatives of the "culture and personality" movement, who used terms such as "group personality", "structural personality", "social character", "temperament", share the position that "psychological characteristics are possessed by individuals" (Kovačević, 1980, 24), but he argues that "according to Cvijić's point of view, those properties of an individual are the result of the life of the national soul", some kind of "individual character", which is decidedly renounced by the representatives of the aforementioned school of thought. As proof of such Cvijić's understanding of a "psychological type" Kovačević cites Cvijić's description of the psychological unity of Southern Slavs⁶, and opposes it to the position of modern anthropology which considers the individual to be the sole bearer of psychological characteristics, and that they are formed under the influence of certain cultural patterns (Ibid.). However, nothing in the citation quoted by Kovačević indicates that Cvijić really thought there was a sur-individual character – namely, Cvijić speaks of psychological traits observable in Serbo-Croats and Slovenians, of their changeability due to cultural and historical influence, and of "ethnic amalgam". The

followed by a series of suppositions often substantiated with the dominant political tendencies and attitudes of the period, and general romantic heritage, seems like a reduction uncommon to scientific objectivity.

- 5 Putting aside the supposition that Cvijić was a double insider, from which the supposition that Cvijić was a "scientist-missionary" may be inferred, we will reflect only on Cvijić's observations on the existence of the missionary idea, the concept of the hero-revolutionary and martyr-sufferer and the significant influence of the Orthodox Church. Numerous ethnological-anthropological, historical, even literary-artistic analyses can confirm that there has been a significant impact of the aforementioned concepts in the process of shaping the dominant social discourse in Serbia – even today, the idea of "Serbian mission" in confronting globalism, for instance, is markedly present in the public discourse, along with martyromanic and heroic ideas, in which Serbian Orthodox Church also plays an important part, along with the (ab)use of the Kosovo myth, which means that, although expressed in rhetorical language and terminology of his time, Cvijić's observations were actually true.
- 6 "Apart from the language, the basic psychological characteristics are the same in Serbo-Croats and Slovenians. They feature intellectual and moral sensitivity, by which they distinguish nuances, often most fine ones, great emotionality and a highly developed sense of empathy, which is at the base of the national soul of all Slavs" (Kovačević, 1980: 25).

mere usage of the term “national soul”, since it belongs to the customary discourse of Cvijić’s time, still does not prove that his understanding of psychological characteristics to be romantic. Kovačević also points up the pragmatic political motivation of Cvijić’s research, and the main objection to the ethnology in the manner of Cvijić is: “the determination of political borders or endeavor to change them on the basis of the distribution of ethnographic material has become one of the basic, although rarely explicitly expressed fields of our ethnology” (Kovačević, 2001, 23). Nevertheless, although Kovačević notices the shortcomings of Cvijić’s ethnopsychological work, which were also the common shortcomings of the ethnopsychology of that period, he concludes that certain methodological mistakes and inadequacies of Cvijić’s research need not mean that we should “completely discard the results Cvijić reached”; instead, “by checking his conclusions using more contemporary methods of social science, a higher degree of testability must be reached” (Kovačević, 1980, 26).

Mladena Prelić highlights the fact that Cvijić, although his opponents often emphasize his political and ideological engagement, “was not directly politically engaged, neither did he hold any state function”, although he, as a respectable intellectual, had influence on public opinion.⁷ Prelić also points up the fact that Cvijić did not think of himself as an ethnologist, despite the fact he highly regarded ethnology, and determines that the reason for the ambivalent interpretation could be that under Cvijić’s influence “ethnology was in a respect absorbed by anthropogeography” (Prelić, 2014, 92), and finally comes to the conclusion that, although Cvijić’s approach to ethnology may have become obsolete in the meantime, it has great historic value and we cannot deny its significance, neither can we deny what is still relevant – and that is its interdisciplinary quality (Ibid., 94).

Objections on the insufficient development of the concept of culture in Cvijić’s scientific system, as well as the fact that since the second half of the XX century ethnology has developed as a science of culture, and claims that “to new generations of ethnologists, Cvijić’s concept seemed ‘narrow’ and insufficient as an explorative framework” (Ibid., 92), are still not ample explanation for certain assessments of Cvijić’s work, which sometimes go to the point of animosity. Although given as a footnote re-

7 “He was politically engaged only during World War One, by participating in diplomatic missions of Serbia, as well as in peace talks after the war, as the president of Historic-Ethnographic Section as a member of the delegation of Serbia at the Peace Conference in Paris, where he played a significant role in determining the borders of the new Yugoslav state” (Prelić, 2014: 84).

cently, the following assessment of the reception of Cvijić's work seems particularly precise and important: "Cvijić's work, as indeed any other, can by all means be interpreted critically; however, recent publications on the subject (Milenković, 2008; Pišev, 2010 and 2013) completely separate Cvijić from the concept of his epoch and seem to accuse him without enough arguments for (Serbian) nationalism, even racism. Moreover, Kovačević's critique of Cvijić as a romantic could also be re-examined (Kovačević, 2001, 27–44), considering the fact that it is questionable whether Cvijić's psychological types (which, in his opinion, are built by the correlation of man and his natural environment and do not necessarily correspond to ethnic groups) can be essentially identified with the romantic concept of the spirit of a nation. Today, Cvijić's work may be considered outdated on account of its positivism and its implicit or explicit Yugoslavism, proclaimed to be historical and scientific fallacy, rather than because of its alleged romanticism or Serbian nationalism." (Ibid., 94).

ETHNOPSYCHOLOGY AND THE DEVELOPMENT OF ETHNOLOGICAL STUDY OF PSYCHOLOGICAL PHENOMENA IN SERBIA

At the end of the XIX and the beginning of XX centuries, ethnology was marked by the instrumentalization within the scope of national-state projects, and that was not the case only in the Balkans. In Cvijić's time, it was a tool of political strategies in entire Europe, characterized by positivist aspirations, as well as romantic nationalism and the belief in "the spirit of the nation". The influence of ethnopsychological school was also present in the period – from Lazarus and Steinthal, who in 1851 coined the name *Volkerpsychologie*, via Alfred Fouillée and his works *The Psychology of French People* (1898) and *The Psychological Draft of European Peoples* (1902), to Wilhelm Wundt and his *Volkerpsychologie* with which ethnopsychology was established. Later, owing to Ruth Benedict's research (*Patterns of Culture*) and Margaret Mead, the terms such as *psychological type* and *cultural pattern*, Kardiner's *basic personality*, or Cora DuBois' *modal personality* begin to appear. Starting from the position that basic psychological patterns are to be found in culture, psychoanalytical research identified the significance of ethnos for forming the psychological identity both of an individual and a group. Significant results were made by Anglo-Saxon and French anthropology and ethnology in the examination of characteristic personal traits of members of certain types of cultures – from the abovementioned Ruth Benedict and Margaret Mead, Malinowski, Boas, Durkheim, Mauss,

Levy-Bruhl to Levi-Strauss. Ethnopsychiatry, particularly developed in France, also gave important results, e.g. in the work of Georges Devereux. In like manner, sociological investigation dealt with the psychology of the collective – the understanding of the character structure common to the majority of members of a society as an important formative factor of the character of an individual is one of the crucial point of Fromm's analyses; furthermore, under the influence of psychoanalysis, social psychology and the psychology of culture lead to the development of cultural anthropology (more in Poirier, 1999 and Deliege, 2012). Although ethnopsychology as an academic discipline was abandoned in 1950's, on some fundamentals set by the pioneers of ethnopsychology, psychological and cultural anthropology developed in the world, as well as cognitive linguistics and ethnolinguistics.

The development of ethnopsychology in Serbian science ceased after World War Two primarily because of its abuse within the scope of racist and Nazi theories, but also due to the domination of Marxist ideology and the marginalization of distinct national identities. Further development of ethnological examination of psychological phenomena, Kovačević observes, completely withdrew from 1945 on under the influence of Marxism, and social psychology, the psychology and sociology of morality and other sociological disciplines took their place (Kovačević, 1980, 29–30). The renewed interest for ethnopsychology in our country appears at the beginning of 1990's – but it did not have exclusively scientific, but again, political reasons and took place as a part of the national awakening of the former peoples of the SFRY, only this time it was essential to accentuate their distinctness and originality. After the disintegration of Yugoslavia, resistance towards ethnopsychological and similar examinations reappears, again for ideological reasons, since that the interest for national identities – unless its purpose was deconstruction of the notion of the nation and a critique of nationalistic and essentialist concepts – was often perceived as a potential danger of nationalism, which was the cause of suffering during the 1990's. By necessarily attributing to ethnopsychology an organicistic concept of nation and the national spirit or character as a fixed, stereotypical property, ethnology and anthropology in Serbia marginalized ethnological/anthropological research of psychological phenomena, in spite of their advancement in the world, thus causing certain wariness of this type of research. The mistakes of the growing discipline or fallacies shared by the pioneers of ethnopsychology in Serbia and their scientific contemporaries were made into one fixed, "character" trait of ethnopsychology, which prevented it from identifying aberrancies from the mainstream and their original contribution, as well as the value of ethnographic material gathered in the process of research.

PSYCHOLOGICAL TYPES OF SOUTHERN SLAVS BETWEEN ETHNOPSICOLOGY AND CULTURAL ANTHROPOLOGY

Cvijić's ethnopsychological research was under the shadow of a doubt from the beginning – from questioning the mere method of ethnopsychology and its foundation in science, via objections on the bias in some of his observations, to problematization of the precision of the classification he made (Lukić, 2000, 7–10). Cvijić considered psychological characteristics of a nation to be the subject of anthropogeography. Apart from emphasizing geographical conditions as important factors in forming the psychological characteristics of the collective, he also emphasized historical, ethnic and social ones. He was aware of the difficulty of his task, because of the fluidity of the subject itself, and said that “the ideas and motives of human groups [...] are like a fluid running between your fingers and cannot be caught” (Cvijić, 2000, 326). Cvijić's understanding of psychology was to a certain degree in accordance with Wilhelm Wundt's ideas of the psychology of peoples⁸. Wundt points out the significance of Ratzel's anthropogeography and states that ethnology⁹ cannot deal only with the present behavior and characteristics of a people, but must also investigate their origin and the process of the generation of psychological and mental traits. Such Wundt's interdisciplinarity and perspectivism, coupled with the emphasis on the claim that psychology of peoples should not convey the characterization of a people, but rather the conjoining of the results of the research in the fields of language, religion and custom, as well as that individual psychology is conditioned by collective psychology are, as we shall see, close to Cvijić's attitudes.

Namely, at the beginning of *Psychological Characteristics of Southern Slavs*, Cvijić emphasizes that “the task of anthropogeography is the determination of psychological properties of population in various natural areas and highlighting the participation of geographical conditions in the for-

8 Namely, Wundt maintains that psychological development is conditioned by the spiritual environment of an individual – one's culture and influences whose investigation cannot be tested in an experiment; by spiritual environment he means the totality of psychological life and products of culture, especially emphasizing the influence of language, art, myth and custom (Wundt, 1916).

9 Wundt defines ethnology as a science which studies the origin and characteristics of a people, their distribution, and psychology has a somewhat subsidiary role in it (Wundt, 1916: 6). By the same token, he considers that ethnically connected people can, psychologically speaking, demonstrate different stages of mental culture. (Ibid.) Therefore, in order to fulfill its tasks, psychology of peoples must employ diverse methods (Ibid.).

mation of the psychological properties" (Cvijić, 2000, 326). In addition, Cvijić states that anthropogeography should neither neglect "historical, ethnic and social" conditions contributing to the formation of the mentality of a people which are intertwined with geographical factors (Ibid.), and underlines a "comparative or relative value" of the assessment of the psychology of "the mass of a nation", as well its variability (Ibid.). It is exactly these observations that distinguish Cvijić from the ethnopsychology based on romanticism. Although aware of every observer's potential partiality¹⁰, Cvijić will try to deal with this demanding subject by employing several methods – the methods of determination of psychological or ethnopsychological profiles by direct observation, which are in some respects similar to geologic or geomorphological profiles, while bearing the entirety in mind (Ibid., 326); the methods of noting the differences between the population of the native land and of the land colonized by the people of the same origin; and, finally, the methods of indirect observation, that is, drawing conclusions based on available ethnological, anthropogeographical and historical data. In doing so, Cvijić devoted special attention to clothes and dialects, and stressed "the national mindset regarding the meaning and value of human life" (Ibid., 327). It is exactly "the national mindset regarding the meaning and value of human life", or rather, the analysis of the concepts of culture, also conditioned by language, that indicates Cvijić's essentially close position to more recent attitudes of cultural and cognitive anthropology. Cvijić points out folklore as particularly important for discovering psychological facts: "But of all ethnological facts, folklore is the one most revealing of the psychological" (Ibid., 327). In observing historical and cultural relativity and the variability of psychological characteristics, as well as the meaning of folklore for psychological exploration, Cvijić's opinions were quite consistent with those of Franz Boas, who had indubitable significance not only for the development of cultural anthropology, but also for the development of folkloristics. Boas' idea was that, for ethnological research, the influence of psychological and physical features of people, which developed under the influence of environment, was of unquestionable importance. According to Boas, environment included not only social, but also geographical surroundings, as well as the history and religion of a people".¹¹

10 "(...)in everyone, the spirit, passions and prejudices of his age prevail more or less, so that it is almost impossible to be completely impartial" (ibid.: 325).

11 As the subject of ethnology and anthropology Boas, similarly to Cvijić, determines the following: "(...)the object of our science is to understand the phenomena called ethnological and anthropological, in the widest sense of the words, in their historical

Quite in the spirit of contemporary ethnolinguistics and cognitive linguistics, and similar to Wundt's observations of language as the most significant cultural-psychological product linked to psychological phenomena, Cvijić stresses the importance of language in understanding the differences between certain South Slavic groups and says: "Linguistic characteristics are unquestionably very instructive, especially the dialects. (...) The classification of Southern Slavs which we are trying to give is not a linguistic classification. It should be based on all psychological characteristics."(Cvijić, 2000, 328). This observation is undoubtedly true – since conceptualizations of the world, therefore, conceptualizations of emotions and emotional reactions, as well as typical behaviours of individuals, are under considerable influence of a linguistic image of the world. The same is evidenced by the contemporary ethnolinguistic and cognitive-linguistic research. However, Cvijić shows some caution here and adds: "In many cases ethnic groups with various dialects make one entirety in psychological respect" and "the population of the same dialect shows sometimes great psychological differences, by means of which clearly demonstrated psychological groups are discerned" (Ibid.), having in mind additional factors he previously spoke about – historical, geographical, religious and cultural influences.

Cvijić's scientific caution and awareness of the difficulty and complexity of the task he undertook is seen at yet another point. He explicitly states that he does not want to write an ethnopsychological study, but wants to point to the fact he observed in the behaviour of the people which can indicate the *causes* of psychological characteristics: "Anthropological research in fact does not have anything to do with the studies whose purpose is to determine psychological characteristics, apart from some particularly noticeable facts which can arouse attention of the researcher. The research can be used only in so far as it relates to the causes of psychological characteristics. Even thus limited, the data of the research should be used with the utmost attention" (Ibid., 328). Explicitly rejecting the racist theories of peoples of Gobineau, Vacher de Lapouge and Chamberlain, and emphasizing that races, in an anthropological respect, do not correspond to ethnic groups, Cvijić still maintains that it is not true that anthropological features have "no influence on psychological ones". Emphasizing that the peoples of Europe are of mixed origin – by which he explicitly discards both organicistic and biological conceptions of peoples, characteristic for romanticism, Cvijić also considers that "when we put

development and geographical distribution, and their physiological and psychological foundation" (Boas, 1974: 63).

aside the influences of geographical environment, historical development and of civilizations, there remain some psychological differences, which we must assume to depend on their ethnic composition", but he does not explain that with "innateness" or similar romantic, or even racist categories, but "the oldness of ethnic amalgam" and cultural influences on it: "the younger an ethnic amalgam is, the less it has been processed by civilizations, the better the psychological features of its ethnic constituents can be discerned. The differences in ethnic composition already have significant effects on psychological characteristics of the French, English, Italian and German nations, which have been processed by civilization for centuries. The influences of ethnic composition on Southern Slavs can be felt even more so – they have been less transformed by civilization and are even today subject to instances of great ethnic blending." (Ibid., 329). Attention should be paid to the fact that Cvijić uses the term "ethnic amalgam" here – thus indicating combination and mixing of different ethnic groups, and not the "purity" and "common origin" of the nation, which is a commonplace of romantically oriented theories of peoples; he emphasizes the crucial role of civilization in shaping and changing of psychological characteristics, by which, he, in fact, declares his position on cultural conditioning of the behavior of both an individual and a group, and not on innate and fixed character traits or mentality of peoples.

Cvijić is aware of the insufficient theoretical and methodological foundation of his endeavor. Therefore he writes: "Besides, even if the anthropological facts gathered so far were rationally carried out, they are still insufficient for a proper anthropological characteristic of South Slavic groups: only some general results are valid, but they are also attainable by common observation." (Ibid., 329). Therefore, while being scientifically strict towards his own undertaking, aware of its defects and, at the same time, the complexity of the subject, Cvijić appeals to his future reader for a conditional acceptance of the given classification of Southern Slavs. He also stresses that peoples and ethnic groups differ in "almost unnoticeable nuances in the functioning of physiological life" which seem to "make the foundation of various feelings and various psychological aspirations", but points out that only a future development of "physiological and chemical method in examining human organism", [...] might "be able to provide information on some deeper differences between nations." (Ibid.). With this final sentence, Cvijić points to the possibilities of the development of physiological psychology, which started with Wundt's research (Wundt, 1902).

In pointing to common basic ethnic features of Southern Slavs, Cvijić par-

ticularly emphasizes the language – which is, after all, the conveyor of not only cultural, but also cognitive unity¹², and goes on to tackle historical and culturological *reasons* for the creation of awareness of that unity, and the history of the *creation* of the Yugoslav idea (Cvijić, 2000, 332–335), which, again, is not in accordance with the ideas of romanticism. Romanticism, starting from Herder's stances, sees the identity of a nation in its pre-determined and unchangeable common spirit. Although speaking about unity, Cvijić points to geographical, historical and cultural reasons for the emergence of different types, varieties and groups, and gives the psychological classification of Southern Slavs, yet draws attention to the fact that the types are not clearly separated: they "transfer to one another in transitional zones, whose populations can often be ascribed to either one of the types" (Ibid., 336). When he indicates certain psychological characteristics, such as "herd characteristics", "a brigand/insurgent mentality", "habits of tribal life", Cvijić speaks of them as "the psychological remnants of earlier times" (Ibid., 335) – therefore, he speaks of them as historical circumstances conditioned by models and types of behaviour, and not "innate" character traits. These very remarks indicate that Cvijić's stances are much closer to the future stances of cultural anthropology, than to those of romantically based ethnopsychology, although, in his time, he could use neither the terminology, nor methodology of this science.

Although Cvijić's *Psychological Characteristics of Southern Slavs* has been categorized as a work of romantically based ethnopsychology and discarded along with the entire discipline as an unreliable scientific creation, the point should be stressed that Cvijić does not refer to the psychology of the

12 From Humboldt's ideas of the spirit of language, which arises from the spirit of a nation (Humboldt, 1988: 148–149), the modern idea of the linguistic image of the world was created, which is usually defined as a naive (national) image, made up not only of individual prototypical concepts, but also of collective stereotypes, based on semantic and intuitively known encyclopedic information. Language is defined as the fixing of a particular way of seeing the world of a specific group; the closeness of naive images of the world is explained by being conditioned by the common tradition, culture, civilization and the historical experience of a people. Therefore, the essential internal semantic typology is concerned here, or rather, the characteristic ability to conceptualize the world in the languages of certain peoples. Arising from this conceptualization, typical conceptualization of emotions and behavior emerge. The theory of linguistic relativism, known as the Sapir-Whorf hypothesis, was formed on these assumptions, which are the foundations of the modern ethnolinguistics and anthropological linguistics. Humboldt's definition of a nation as a spiritual form of humanity to some extent also corresponds to modern theories of nation and ethnicity as cultural and symbolic, and not forms of community tied by blood relations, i.e. it is the form which is based on a common culture and subjective conviction of belonging, rather than on the objectivity of a common origin (see more in Bart, 1997 and Anderson, 1990).

people, but creates the division into anthropogeographical zones, in a fashion which is in many respects corresponding with the cultural zones of the contemporary cultural anthropology. We can agree with Petar Džadžić that there are certain places in Cvijić's work which could be properly characterized as instances of "national romanticism in the manner of Herder", but they could also be considered as a commonplace of scientific discourse of that period and interpreted by understandable national enthusiasm in the period of the liberation wars and the forthcoming unification of Southern Slavs. Also justified is Džadžić's observation that Cvijić probably strived to present Southern Slavs as "vital, naturally intelligent and highly gifted people" precisely because his work was first published in French, at the moment when there was "a certain amount of scepticism and insufficient knowledge of Southern Slavs and the Balkans in European circles", which explains his "pedagogic-aprioristic tone" (Džadžić, 1988, 206–207). Furthermore, Džadžić's view that the objections generally referring to ethnopsychology could also be addressed to Cvijić's psychological types could be accepted as well. These objections are: "an unattained model of scientific completeness, the inability to test the results, possible randomness of conclusion and a 'literary' upgrade of the real" (Ibid., 206), all of which Cvijić was aware. Nevertheless, Cvijić cannot be denied a whole series of "critical observations of the psychological composition of the analyzed ethnic groups" (Ibid., 205). One should also highlight the qualities of a direct insight into the life of the people, quite a modern grasp of the influence of the acculturation processes in forming psychological characteristics, and accentuating the differences between urban and rural population. Reading of Cvijić's *Psychological Types* certainly demonstrates, as Džadžić also observes, that he did not assign to ethnos-nation the decisive importance in forming psychological types; instead he underlined the importance of geomorphological, climatic and historical factors, conditioning by a certain type of culture and civilizational influences, which undoubtedly sets him apart from the romantically based psychology of nations and brings him closer to the contemporary understanding of the problematics.

JOVAN CVIJIĆ AS A TRIPLE SYMBOL

Science, as we will all agree, cannot be an entirely objective description. That is the insight reached after a period of the domination of the positivist conception. The shift was caused, among other things, by the insights of linguistic-analytic philosophy, and it led to the study of science from the aspect of general semiotics and communication theory, to determining rhetorical features of scientific discourse which may appear both on the sur-

face – stylistic level and in its deep structures. The entire construction of a scientific text – including the notional apparatus, acceptance or rejection of certain scientific theories, semiotic and linguistic organization, the manner of argumentation, use or omission of certain literature, utilization of scientific apparatus – can be viewed as a rhetorical device (Gordić, 2007), which can also be a sign of implicitly or explicitly involved ideologies. The goals of scientific research also represent a rhetorical field of its own kind – be it the matter of strictly epistemological goals or their ethical, aesthetic, strategic, ideological and political implications. A scientific text is not only a mirror of personal intentions of an author, but also the reflection of the dominant scientific, and quite often of the ideological and political paradigm, which is particularly noticeable in social sciences and humanities, but is not necessarily restricted solely to them. Therefore, one must always bear in mind that the scientific theory, methodology, and the language of a scientific text are all products of history, subject to change; thus, they represent both the reflection and a part of a certain culture's image of the world, that is, the order of the discourse and the dominant episteme (Foucault, 2007). Contemporary science is not an exception. Hence, the interpretation of a certain scientific body of work aiming at elementary objectivity attainable to science and reason must take into account historical context. Otherwise, it can fall into interpretative anachronism and transform itself into a primarily ideological-rhetorical text which settles scores with its unwanted scientific predecessors, or can even turn into a panegyric of their achievements.

The starting idea of our study is that the determination of contextualism and intertextuality of the scientific text represents the way to an objective assessment of Cvijić's ethnological research. At the same time, it includes the comprehension of those characteristics of Cvijić's work which represent a common quality of scientific discourse of his epoch, application and acceptance of ethnological theories and methodology of the period, stylistic features of scientific expounding, and also observation of Cvijić's original scientific contribution. The reception of Cvijić's work after World War Two to the present day in certain respect reveals the reasons for the insufficient development of psychological anthropology and similar disciplines which had its beginnings in the former ethnopsychology. Serbian ethnology and anthropology have not kept pace with significant results concerning the investigation of psychological traits of members of certain types of culture, as were achieved e.g. in the works of Malinowski or within the framework of psychological and cultural anthropology, as presented in the works of authors such as Ruth Benedict, Margaret Mead, Boas, Durkheim, Mauss, Levy-Bruhl, or Levi-Strauss, neither did they pro-

duce works in the fields of ethnopsychiatry or cognitive anthropology. It is only recently that studies which follow contemporary trends in the field of cognitive linguistics and ethno- and psycholinguistics have started to appear; these studies also enter the domain of psychological research.

Unlike the assessment that Cvijić had the role of a “triple insider”, our assessment would rather be that Cvijić has in fact, in the course of time, acquired the role of *a triple symbol* – for Marxist-oriented post-World War Two intellectuals, he was a symbol of the monarchist and bourgeois Serbian science; for nationalistic-oriented intellectuals coming from various places, he became a symbol of the Yugoslav idea and/or Greater Serbian pretensions; finally, for the generation intellectually matured after the wars in the territory of the former SFRY, he became a symbol of the traditionalist-oriented ethnology¹³ and Serbian nationalism. However, this triple and in many ways contradicting symbolism is not so much representative of Cvijić’s work as much as it is revealing of the (in)ability of an objective appreciation of the significance and real understanding of predecessors. It is a testimony to our own ideological passions, political nightmare in which we live and – finally – our (both individual and collective) psychological characteristics. Therefore, we should at least in earnest embrace Cvijić’s warning to Kočić and guard ourselves from *political trifles and infamies*.

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13 If blind traditionalism is hindering the progress of science, strategies of presenting new scientific theories which neglect or completely disregard the significance of former generations of scientists and give their own achievements a revolutionary character damage the principles of scientific ethics, and are often a sign of the ideologization of science, because they signify an ideological-political encounter rather than objective scientific critiques and debates.

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FOLLOWING JOVAN CVIJIĆ PATHS: THE TRADITIONAL RURAL ARCHITECTURE AFTER WORLD WAR II

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ABSTRACT: Jovan Cvijić research and scientific work is necessary in getting to know the past of the Balkan peoples and their way of life. Thanks to Cvijić's special perceptual ability for the reflection of the traditional way of building, number and types of buildings nearby the house and also the importance that it gives to the community, are not missed out or forgotten. House types and the surrounding outbuildings were a couple of the many topics that interested Cvijić. In this paper, following Cvijić research, I will examine the societal trends towards the traditional rural architecture in Serbia in the period after World War II. In the early postwar decades, in line with the trends of social development, the prevailing approach towards this kind of heritage caused its devastation. The changes that have marked the last decade of the past century and accompanying different attitudes towards traditional heritage prompted the revitalization of collapsed architectural objects and their subsequent adaptation to the needs of rural and cultural tourism. This paper aims to show differential utilization of the traditional architecture in the altered conditions of rural life during the second half of the last century, because since the time when Jovan Cvijić was interested in the conditions and ways of living in the Balkans (and therefore, the territory of the Republic of Serbia today) passed a century.

Key words: Jovan Cvijić, Balkan Peninsula, traditional architecture, rural tourism, Serbia

INTRODUCTION: CVIJIĆ FIELDWORK

The legacy of Jovan Cvijić scientific work is still indispensable in studies of the past among the Balkan populations, their way of life, inventiveness and ability to create. House types, outbuildings and associated culture of habitation were just a few of the thematic areas studied by Cvijić. The position

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and appearance of houses, buildings used for processing and / or storage food, construction methods and materials used, reflect the inventiveness and creative ability of populations, way beyond the range areas covered by Cvijić's fieldwork. Architectural objects, in addition to clothing, are the most visible expression of human creation, even in circumstances short of a possibility to gain insight into their interior layout and way of furnishing. The traditional way of building, number and types of buildings on the plot, but also the appreciation for these objects by peoples, could not slip Cvijić's attention, given his expressed perceptual ability. The importance of suitable places for founding settlements and construction of buildings, their varieties, adaptation to environment, materials used in construction, and habitation in accordance with the existing environmental conditions – these topics are presented in the chapter *House types* in the study *The Balkan Peninsula and the South Slavic countries* (1966).¹

This study did not lose its importance even at the present time. In any ongoing studies, whether their aim is the comparison with the same or similar present day objects, or the functional transformation of a house itself and its interior, Cvijić's observations still represent a solid starting point. Consider, for instance, the following observation: "a passenger who has spent a long time in the mountains, desolated and without any traces of human work and life, feels the joy when, descending into valleys, finds the first houses, scattered or dense. At that moment, the passenger clearly becomes aware how houses contribute to the appearance of the landscape" (Cvijić, 1966, 277); we have to admit – this statement has not, even at present, lost its actuality, on the contrary. Or, just think through: how many times have we felt, during our fieldwork walks on mountain cliffs, a true joy of seeing a settlement, announcing a good opportunity to rest and engage in conversation, but entwined with some bitterness caused by empty, abandoned houses and those are many in recent times on the territory of Serbia. Then again, homes/houses in rural areas, closer to the cities are much "wealthier" and comfortable than they were in the Cvijić's time.

Almost as a rule, Cvijić's research included a field tour throughout the Balkan Peninsula, in order to acquire more information about the geography of its different areas;² meetings with village residents were

1 For a review of Cvijić's vision of rural architecture I used the study *The Balkan Peninsula and the South Slavic countries* (Belgrade, 1966), first published in French language.

2 J. Cvijić was a geographer, but also engaged in social and physical geography, geomorphology, geology, human geography, and ethnography (Radovanović, 1958; Stanković, 2006).

inevitable in such circumstances. Thus, he became interested in the populations, their way of life, perceptions, habits, and customs, so his reflections on settlements formation included also the size and appearance of backyard and consequently – of houses and outbuildings. As his research “laboratory” included almost the entire Balkans, the data on habitations and houses concerned the whole area – at the present time, these are the states that developed after the breakup of Yugoslavia, then parts of Bulgaria, Greece and Albania. There are almost no data about the Pannonian Plain and the house type as its representative, since Cvijić intended to write up a separate study about this area.

Until relatively recent times, the construction of houses was largely a reflection of climatic conditions and available materials, nonetheless it also depended very much on specific occupations related to certain places or areas. This is what Cvijić says about this matter: “A house is in harmony with the composition, appearance and landscape vegetation (...). It is clear that houses and surrounding buildings are adapted to the available means of constructions located in these areas, but also they are depended on the inhabitants’ occupations. On closer examination (...) it appears that a house reflects a substantial part of the prevailing culture: a house is a cultural object subject to evolution, the very one that transforms humans; along the way, humans tend to change the shape and material used to build houses, the arrangement of its internal parts and household items (...). There are, therefore, a variety of diverse houses at the Balkan Peninsula, due to availability of various construction materials in certain areas, then the different professions, the influence of both old and new civilizations and ethnic preferences” (Cvijić, 1966, 277-278; 279).

The appearance and interior furnishing of houses reflect folk views and needs in relation to accommodation. However, oftentimes, folk conception of a house is primarily tied to the room where a hearth is located, that is, to the area where the fire is lit: “For the overwhelming majority of the South Slavs in the Balkan Peninsula, the folk notion of a house is related to the room where an ingle or fire is lit, which can be entered directly from outside or from porch or anteroom; when you are in the room, it is said: ‘Go in the house and bring water’” (Cvijić, 1966, 279).

Therefore, the above-mentioned notion is undoubtedly “a reminiscence to the original shape of houses, when they had a single room with an ingle” (Cvijić, 1966, 279). So, according to Cvijić, in the earliest phase, a house had only one room, and it was the base from which the later evolution started. This means that the original type – *a single room house* – was the basis of creativity and the future creation in this domain. It is difficult to

ascertain the exact appearance of the oldest house type among the South Slavs but with certainty we can argue that "the primitive single-room house, sometimes made of plank, wickerwork or poles prevailed in all the villages during the Turkish period (...). And later, after the liberation of the Balkan states, this house type remained as home for poor or served as a shepherd's hut" (Cvijić, 1966, 280). Hence, Cvijić argued: "Due to the variety, it is difficult to ascertain the main house type. And since the (...) influences changed: due to deforestation, timber gradually disappeared, cattle breeders became farmers, civilization came over one another and due to collective migrations of various ethnic groups settling far from their homeland but carrying their habits – evolution which transformed certain house types should be monitored closely" (Cvijić, 1966, 279).

By observing the variety of houses and other surrounding buildings, Cvijić realized the importance of landscape layout, and the impact of the natural environment to the architecture; additionally, he also stressed that the changes in the form and construction of houses were an integral part of a given community development. "A passenger who has spent a long time in the mountains, desolated and without any traces of human work and life, feels the joy when, descending into valleys, finds the first houses, scattered or dense. At that moment, the passenger clearly becomes aware how houses contribute to the appearance of the landscape. And this impression differ greatly if one comes down the high Dinaric mountain chains to the Adriatic Sea, entering the area of stone-built houses, and also, the impression differs furthermore if one comes down from the same mountains to the Danube and Sava Rivers in the area of wooden houses, or even descending lower, into the area of the Pannonian rammed earth houses" (Cvijić, 1966, 277).

Given the human need to make changes and bring something previously unknown to their everyday life, and correspondingly, in the mode of building and furnishing the facilities, Cvijić noted the following: "As a result, the landscape did not remain constant, given it was affected by house style and the surroundings, since houses changed in the course of historical time (...). From the first tenth of the nineteenth century to the present, even in the most remote regions, new house types have begun to penetrate, made of various shapes and materials and of various origin, usually built on the model of the city houses (...). Forms and types of houses (...) are exposed to the greatest changes since the liberation of the Balkan states, and these changes are increasingly accelerating. And not only houses are subject to change, but also buildings or barns and types of vegetation around the house, especially trees (...). Like never before,

farmers in Serbia are aiming for progress, introducing so many novelties in habitation area, especially since the first tenth of the nineteenth century, and now even more. In addition, the populations and their respective groups have a preference for one or another way of life, which vary according to the geographic environment, and have different customs and habits, thus a different taste, according to which they decorate each new house" (Cvijić, 1966, 278-279).

It is interesting to assess Cvijić's take on why the changes in house development did not go faster and hence became more visible. He pondered that accelerated changes and greater progress were somewhat hampered by the conservatism of women, "changes to the appearance of houses and arrangements of the house parts would have been even greater if not for a peasant woman, who cannot keep up with her male counterpart, because peasant males travel more, they observe, and adopt the perceived; it is well known that women can affect a great deal all the house matters" (Cvijić, 1966, 279). This line of thinking can hardly be fully accepted as the only and real cause of the habitation culture at the time of the Cvijić's studies. It is undisputed that women were, for a long time, devoted guardians of home tradition, and it is likely they have the same function today in certain segments of the traditional heritage. Nonetheless, important decisions regarding the household economy were always made by men, not women. Building a house or an outbuilding certainly belonged to such a decision. Then again, the construction of any building, especially a house, required considerable material resources that not every household could provide. Since the decisions of this kind were usually made by adult male members of the household, to "accuse" women of limiting the progress in the sphere of habitation is definitely unacceptable, despite the fact women were considered as guardians of tradition, seen as more focused on the house, had travel considerably less than males, who, for various reasons, "abandoned" their homes more often.

Cvijić emphasized that a house is an anthropological, geographical, cultural and historical subject, and he considered the house types and their evolution from this perspective (Cvijić, 1966, 284). According to Cvijić, "a special house type at the Peninsula", prevailed during the 19th century, and even at the time of his research, "outspreading from the Sava and Danube Rivers in Serbia, was the log cabin of the Dinaric woodland area", which was: "still the main type of house in the mountains and western Serbian Dinaric areas. It is widespread also throughout woodland areas: such as, for example wooden houses around the Kupa and Una Rivers, around Plasko, in Lika, Banija and Kordun, all wooded areas. This Dinaric log cabin

is therefore, the preferred house of the forest regions, whether as a true type log cabin or mixed with mud. Although there are area differences in the type of log cabins, they are not of great importance. In general, cabins had, in addition to the same material used, the same interior layout and household items. They have largely disappeared in the plains and around hilly areas, especially in Serbia; today, through the valleys of western Serbia from the Sava River towards to the south and southwest, brick houses dominate, covered with tiles, but then they give way to those houses made of plaits and mixed materials, and only in mountainous regions the log cabins still dominate, with high shingle roof" (Cvijić, 1966, 284-285).

In addition to log cabins, Cvijić presented the appearance and interior layout of other types of houses too, starting with – as he calls them – the most primitive (*Shack of conical shape made of the long trunks, mill using horse drive, dugouts*), then bare stone houses, adobe and wattle (aka. *moravka*), to newer types of houses, whose appearance marked the beginning of brick use in construction. In Serbia, log houses, plaits like, adobe, as well as those of made of brick, depending on the region, formed the way of habituation for a larger part of the population; while wood, earth and baked bricks were primary materials for construction in rural areas well into the 20th century. Within the auxiliary buildings, Cvijić was drawn to describe objects of different purpose: *buildings* or *barns* (around the house or in the mountains), *vajat* type ("home" of the newlyweds), *dairies*, *sobrašice* (placed around churches or monasteries in western Serbia), *beer houses* (wine-growing buildings in Negotinska Krajina and in Kopaonik Parish), and others. (see Radovanović, 1958, 115–116).

Many scientists later pointed out that Cvijić, in his studies of house types, from the most primitive to the most developed, made a significant mark in anthropogeography, ethnography and sociology of habituation. Also, he noted down the most important factors and pointed to those that have contributed to the change in houses appearance and size (Lutovac, 1966, 572). Changes in the appearance and functions of houses were present even from the earliest period and Cvijić emphasized this point. The time period until World War II, approximately about the time Cvijić engaged in research,³ was a relatively peaceful for most residents in rural areas in the sphere of material and spiritual, as structural changes were slower. However, the time period after World War II was profoundly marked by changes that had affected all segments of life within rural communities, resulting in a deep change towards almost all inherited values, and even to those in the field of traditional building and habituation. Therefore, the intriguing

3 Jovan Cvijić died in 1927 in Belgrade, more than a decade before World War II.

question remains: what has happened to the architecture prevalent in rural areas in the territory of the present Republic of Serbia until World War II is it completely gone or had it managed to persist through time and flurries of social change and modernization flow? Since the time of Cvijic's studies to this date, the society endured substantial transformations, and the consequences of these processes are seen in almost all spheres of rural life. As the periods of socialist and post-socialist development of the society were very turbulent, consequently, social, economic, cultural and other changes became considerably more visible and more influential, since resources and assets became more readily accessible to all strata of the society, and therefore – to more people. In this sense: "Higher social standards and cultural resurgence entail building a better home. Previously, houses changed very slowly, even among the wealthier farmers who sought to expand the possession by land purchase. (...) When agriculture lost its significance in comparison to industry and anticipated profit, the main attention turned to home appliances and furniture" (Lutovac, 1966, 573).

Although the construction of houses based on city models was also known at the time Cvijić did his studies, from the middle of the fifth decade of the 20th century (after 1945), such construction gained a momentum, as the houses in rural areas were increasingly made like those in the cities. Given that the first decades after World War II were a time period of significant changes in almost all spheres of life, with the old patterns rapidly changing or being abandoned all together, the rural architecture also went through considerable redesign: "...besides the old Moravian House one can see modern buildings. Dinaric log cabin that had earlier already gave way to houses built of stiffer materials, is being even faster replaced. This is influenced not only by the advantage of stiffer materials, such as bricks and tiles, but also the increasing value of forest in industry. Nowadays, thanks to better transport links, buildings of bricks and tiles are erected even in wooded mountainous areas (Lutovac, 1966, 572–573).

Since the time of the Cvijić's research to date, it is more than evident that houses and habitation had changed considerably – not only in construction, but also their structure and functions had altered too. Certainly, these alterations were brought about by the modernization of the society in the period after World War II; in turn, that same modernization significantly determined attitude towards traditional heritage. Massive construction of new houses, buildings and ancillary facilities during the seventies of the 20th century originated as a result of better living conditions and financial possibilities. Until the middle of the last century, a typical house was made up mainly of two rooms – the "house" (kitchen) and

(guest) room; this was replaced by a significantly bigger house, with several departments and almost always with a basement as a storage room, and often with floor and attic. And while in the traditional architecture house functions, due to its limited size and fewer rooms, have been limited, the newly constructed residential buildings combined the functions of habitation with storing certain types of food.

If we interpret the socialist period in the positive context, then we have to acknowledge its contribution to the improvement of living standards for all, raising financials of households, which for many meant an escape from poverty. In the field of architecture, these decades facilitated the construction of residential and economic buildings – by choice and preference. The flipside of this approach, in turn, is a more than casual attitude towards the traditional heritage and its obvious negligence in a specific social atmosphere; this assumed a kind of imperative break with the old, “backward” and for many, dysfunctional legacy unable to fit into the newly created conditions of family life in general.

FOLLOWING JOVAN CVIJIĆ PATHS: THE TRADITIONAL RURAL ARCHITECTURE AFTER WORLD WAR II

Given the tendency of social development in the past eight decades, along with the influence of urban culture to rural development in the decades of the late 20th century, we have to pose two logical questions: 1. How did rural architecture develop in this time period?, and 2. What has happened with the traditional architectural heritage of the past (and those of somewhat Cvijić’s time)?

As already pointed out, the most common types of houses on the territory of Serbia were log and half log cabins, and the rest made of natural and available material, like Sun dried earth. They have lasted through time as a silent reminder of the past and different organization of life. Within the folk architecture, a house/home has always been the most important building, expressing the skills and also aesthetic conceptions of the owner, and hence the greater the preservation of houses in relation to other buildings. Through the historical development, a house was always an elementary space where people spend a considerable part of their lives. This has not significantly changed even in the current organization of rural life. Given that a house is appreciated and cared for, all known knowledge and skills are employed in constructions, complying with the established traditional

principles in preparation of construction and building⁴. And although the buildings of traditional architecture largely resembled one another, their appearances, due to the aspirations of builders to fit into the natural environment as much as possible, represent a unique architectural creation, and the facilities, although similar to one another, indeed looked different.

In a traditional rural community, people have a somewhat passive relationship towards nature, since they had to adapt to the nature's laws more often than the other way around; hence, this relation towards the environment can be seen as far more rational than that at a later time, dominated by commodity-money economy. The more rational attitude towards the environment within a family also comes from the financial resources available and the wider community, since investing in something that at a given moment was not necessary was extremely rare. The modernized villages, though, especially places closer to urban areas, are mainly inhabited by residents whose relationship to the natural environment is more active, hence the occurring changes are more diverse, due to the effects of more developed economy. The construction of new, primarily residential buildings in the rural areas was influenced by the social movements that had marked the development in the period after World War II, with an important consequence – the “extinction” of the traditional construction method typical for a traditional village.

Therefore the construction of buildings in rural areas, as well as all that has happened or is still happening, “has its apparent legality. The current changes are only a continuation of a process that has always existed in villages – changes in material upgrades follow social trends”. It is entirely another question whether, in this process, the right path and the right measure were established (Findrik, 1994, 178). More and more, modern construction, in addition to bricks, employs terracotta and reinforced concrete, then iron, and often plastics. In general, unlike earlier periods with a horizontal layout, houses started to rise in height, and as a rule, one or two, and even three stories are not uncommon. This method of construction was not based on the real needs of the owner, but on imaginary assumptions (Ivanović-Barišić, 2006, 70).

Thus, in a relatively short time, the ancient way of building gave way before new technologies and new architectural forms. This was certainly

4 In a traditional rural community, the decision to build a house was of great importance for the family. This was approached with great responsibility, with respect for all known experiences of previous generations – from determining the appropriate site for the construction, through the construction itself, to the move in to a new facility.

influenced by the processes of stratification and uneven economics among families, but other factors as well have contributed to changes relating to the organization of family life and work in the countryside, which, in turn, "fatally affected the traditional architectural understanding. New building materials, modern construction techniques and increased appetites appear to have confused not only farmers but also others in a need of construction" (Stanić, 2002, 15). In this sense, "the modernization of life that has consumed rural areas, imposed its own rules", but its acceptance fail short of adequate preparation. "In addition, the unbelievable rapid development of consumer awareness spread in all our regions, resulting in a loss of esthetics for most" (Ivanović-Barišić, 2006, 71); another consequence was an abandonment of "the past ubiquitous construction rules – to build rationally, to save space and material and to use only material provided by natural environment" (Findrik, 1994, 180). The main determinants of most new buildings are "lavishness" and dysfunctionality. Then again, objects that were not destroyed in the rush to modernize housing have changed the purpose, and often continued to live as storage space for old things. If the population moved to urban areas or went to work abroad, the houses were often left to the ravages of time.

Rural architecture represent a kind of monuments of the past and testimony to the organization of family life. Protection of the rural architectural heritage from waning allows the younger generations to be aware of the past and habitations of their ancestors. At present, it seems that the most effective way to protect (care and maintenance) the existing traditional rural architecture is delivered by individual owners; another successful option, something that has become a widespread practice in almost all parts of Serbia, is a transformation of individual houses and estates into objects of tourism.

This form of tourism in Serbia began to develop even during the seventies, but its significant expansion is related to the nineties of the last century and thereafter. This trend was certainly influenced by social processes in the commercial, economic, cultural and other areas. A trend of tradition revival accompanied by an aspiration to encourage the return of old, forgotten values, in addition to other forms of reviving the forgotten cultural values, encouraged reconstruction of accommodation and ancillary facilities and their adaptation to facilities for leisure or catering services. With such activities, interested households have fit in the rural tourism, providing thus the city folks a unique perspective on agricultural activity and traditional heritage. These, in turn, are the most important motives for vacationing in rural areas (Todorović & Bjeljic, 2007, 138).

As a tourist offer, the presentation of rural architecture and tourist services are carried out in the following ways: 1. individual rural households in rural areas defined for receiving guests and providing accommodation to guests; 2. Authentic or reconstructed ethno-houses in the style of traditional architecture, 3. Preserved whole settlements or areas, and 4. Specific areas with an exceptionally preserved traditional characteristics (Todorović & Bjeljac, 2007).

As far as architecture, there are many authentic rural traditional houses, adapted to fit the tourist offer, but also there are some new objects, built or modeled in the traditional way. This kind of organized tourism can be found in the municipalities of Kosjerić, Valjevo, Zrenjanin, Čačak, Požega, Knić, Lučani, Mionica, Užice, Sokobanja, Čajetina, Prijepolje, Brus, Šabac, Kraljevo, Ivanjica, Rača near Kragujevac, Gornji Milanovac and elsewhere.⁵

Special and specific form of tourism, associated with the traditional way of construction, is the Open Air Museum "Old Village" in Sirogojno. The main activity of the museum is the preservation, protection and presentation of displaced objects of traditional rural architecture, as unique representatives of the traditional rural architecture of western Serbia. This museum space presents as a successful model of project implementation to preserve tradition, not solely in terms of museum preservation, but also in the service of cultural tourism.⁶ Although Sirogojno is classified as an ethno-village, this "village" primarily functions as a museum space. Artifacts, the parts of the tourist offer, are authentic objects of traditional rural architecture of the mountain Zlatibor region (Ivković, 2007).

CONCLUSION

A whole century passed since the days Jovan Cvijić studied the conditions and habitations in the Balkans, including the territory of the present Republic of Serbia. The passed time was marked by events and social challenges that had affected the structural changes in the society in general, changing lifestyles and attitudes of people. The policy of social development in the 20th century, especially in the second half, was based on the overall modernization of the society, resulting in a radical change of life-

5 *Seoski turizam Srbije*: <http://www.selo.co.rs/page.php?id=37> (site visited July, 13th 2015).

6 On cultural tourism and how to get involved see, for example: Đukić Dojčinović, 2005.

style, perceptions and attitudes towards the spiritual and material values. In a relatively short period of time, due the sudden industrialization and encouragement of migration from rural to urban areas, the structure and size of rural settlements became almost totally altered.

The events that marked the 1980s and later decades (disintegration of the state, economic crisis, civil wars, bombings, etc.) have changed the trends among the population towards traditional heritage, as well as to the objects of rural architecture; the earlier function of such objects changed, and thus they have become a source of income and stability for many rural households. The authentic rural architecture, that is, buildings of traditional rural architecture (log cabin, various version of houses made of earth and natural materials, dairy, farms, barns, etc.), represent a specific architectural expression, "and their almost complete integration into the natural environment, often makes them as an extension of nature. A traditional house, as the most typical representative of the rural traditional architecture, is in a complete harmony with the natural environment, also visible within the house parts"(Ivanović-Barišić, 2010, 441). This is the area that witnesses an individual's life cycle (birth, starting a new family, death), a space for everyday chores, but also the space to celebrate holidays. This is the reason why anonymous builders tried to create a house as an appealing space, "where any additions or subtractions would disturb the existing harmony. In this harmony, simplicity and wholesomeness lies the beauty of creation (...) appealing to human daily, ritual, social and aesthetic needs" (Stojičić Dragičević, 2006, 122–123).

Rural tourism offers assume careful advertising. This encourages responsiveness of the interested parties, but it also promotes traditional values. Still, potential users should not get the impression that villages with such an offer are "locked in" the past centuries. Accommodations and offers in the rural tourism may only somewhat remind of the past since these villages and objects are also subjects to civilization novelties, as they are equipped with plumbing system, electric power, modern roads and various media (telephone, internet, mobile telephony), except in exceptional circumstances.

ACKNOWLEDGEMENT: This paper is a part of the Project 47016: *Interdisciplinary research on cultural and linguistic heritage of Serbia. Creating multimedia internet portal: Glossary of Serbian culture. Subproject 2: ethnological and anthropological interpretation of tradition.* The entire projects are financed by the Ministry of Education, Science and Technological Development, Republic of Serbia.

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JOVAN CVIJIĆ AND ETHNOLOGICAL STUDY OF (BALKAN) MIGRATIONS

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ABSTRACT: Nowadays the migrations (voluntary and forced) and concomitant processes of socio-cultural transformations are an important sphere of studies among the Balkan ethnologists and anthropologists. In our migration investigations we often follow “western” models of typologizations and theoretical explanations, regardless of the question whether they are relevant to the specific Balkan reality or not. The initial inspiration was the author’s inner conviction that we should not break the local/regional research traditions and neglect uncritically what was achieved by the scholars of generations before us. Jovan Cvijić is one of these early, influential and still frequently cited Balkan researchers among the pioneers taking interest in the study of migrations on the Balkan Peninsula, researching their causes, directions, characteristics and induced by them transformations of cultural patterns, languages, religions, and ethnicities. The paper critically examines his research work, discussing some of its controversies, on the one hand, and contributions and influence on the study of Balkan migrations, on the other. Simultaneously the author tries to put the methodological and theoretical achievements and findings of Cvijić in the broader context of some of the contemporary migration theories and compare them.

Key words: Jovan Cvijić, Balkan migrations, metanastatic drifts

INTRODUCTION

The Balkan Peninsula is one of these world regions where migrations of individuals and groups are a fundamental element in the everyday life of the populations. Poverty, distress, overpopulation, the search of means of existence or better living conditions, as well as invasions, wars, military

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defeats and victories, pursuits etc. have been more or less direct causes of population movements and displacements. Thus, on the one hand, migrations have come in consequence of the turbulent history of the region through the ages, and, on the other hand – they have been an important factor which has had significant influence upon the historical, socio-cultural, demographical and political transformations in the region. Furthermore, the movements of population have caused continuous (and even still ongoing) processes of distribution, overlap and mixing of ethnic groups, cultural patterns, religions, languages, etc.

Nowadays the migrations (voluntary and forced) and concomitant processes of socio-cultural transformations are an important sphere of studies among Balkan ethnologists and anthropologists. In our migration investigations we often follow 'western' models of typologizations and theoretical explanations regardless they are relevant or not to the specific Balkan reality. The initial inspiration for proposed paper is author's inner conviction that we should not break the local/regional research traditions and neglect uncritically what was achieved by the scholars of generations before us.

Jovan Cvijić is one of these early, very influential and still frequently cited Balkan researchers who we can name among the pioneers taking interest in the study of population movements on the Balkan Peninsula and examining the induced by them transformations of cultural patterns, languages, religions, and ethnicities. The present paper will critically examine his research work, contributions and influence in the study of Balkan migrations. Simultaneously the author tries to put the research achievements and findings of Cvijić in the broader context of and in comparison with some of the contemporary migration theories.

MIGRATIONS IN THE SCIENTIFIC INTEREST OF CVJIĆ

The studies in the fields of human geography and ethnology take important place in Cvijić's scientific work. The fact that the small Balkan territory is populated by many ethnically diverse peoples who simultaneously have been living for centuries in mutual contacts, attracts his attention into the connected to this diversity multifarious historical, cultural, social, ethnological, demographical and biological processes. In this respect, Cvijić examines mentality of Balkan peoples and their ethno-psychological, cultural, social, economical peculiarities. According to him such study must be hold in direct connection with the influence of the natural environment over the humans and vice versa, the humans' influence over the environment (Vlahović, 1987, 9).

The principles of his approach in human geography are explained in details in his programme work *Antropogeografski problemi Balkanskog poluostrva / Human Geography Problems of the Balkan Peninsula/* (Cvijić, 1902). This essay practically lays the foundations of the comprehensive researches of settlements and origin of the population¹ in Serbian human geography and ethnology (Vlahović 1980, 22). Here, his *Uputstva za proučavanje sela u Srbiji i ostalim srpskim zemljama /Instructions for studying villages in Serbia and other Serbian lands/*² is reprinted – they serve as main guidelines for subsequent fieldwork researches and data collection, covering both natural and socio-cultural elements. Besides all other subjects of study, such as location and type of settlements, toponymy, patterns of housing and yard organization, occupations of the population, mutual influence between the diverse cultures and civilizations etc., Cvijić's attention is directed to population movements as well – he deeply examined the causes and directions of migrations and their aftermaths and effects with a view to the origin of population in certain regions.

Further his researches and observations, as well as the results of his colleagues and collaborators³ upon the movements of Balkan population is synthesized and summarized in the study *Metanastazička kretanja, njihovi uzroci i posledice /Metanastatic movements, their causes and consequences/*⁴. In this study, which according to Cvijić's ideas, presents 'guidelines' for further research work, his methodological and theoretical thoughts about migration are developed; it serves as a base for his students and followers to publish new findings and results in the next volumes of *Naselja*.

In these two works Cvijić formulates the great significance and importance which population movements have not only for human geography, but also in each ethnographic research: *When we set aside these European countries from which big masses of people emigrate to colonies or America, in Europe there is not other so turbulent region, with so frequent new population movements and with so significant ethnographic processes of merging*

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- 1 It is the introduction to the first volume of the enormous series *Naselja srpskih zemalja /Settlements of the Serbian lands/* (I–IX), later on *Naselja i poreklo stanovništva /Settlements and Origin of the Population/* (X–XLVII) within the frame of *Srpski etnografski zbornik* (Serbian Ethnographic Collection) of the Serbian Royal Academy (Serbian Academy of Sciences and Arts).
 - 2 The *Instructions* was published for the first time in Cvijić 1896.
 - 3 Their studies are published in the first ten volumes of *Naselja and poreklo stanovništva*.
 - 4 The study was firstly published in French as a separate part in *La Péninsule Balkanique: géographie humaine* (Cvijić, 1918: 112–152), after that in Serbian, in the volume 12 of *Naselja and poreklo stanovništva* (Cvijić, 1922a), as well as in *Balkansko poluostrvo i južnoslovenske zemlje I* (Cvijić 1922b: 161–247). In this text I cite the second publication.

and disordering, such as the Balkan Peninsula is. These migrations and concomitant ethnographic processes have a great influence upon all the subjects and phenomena of our research and thus they are very important in order to solve the human geography problems which we examine... However, these migrations and ethnographic processes have the same importance for all other directions of ethnographic research, which are out of our study. Ethnographic studies which have as their task to explain ethnographic phenomena must take into consideration the research findings about migrations and origin of population; it is especially necessary in researches of areas with new population and multifarious ethnographic composition, such as Serbia is (Cvijić, 1902: CLV).

Cvijić also notes that as a result of continuing for ages migrations the disposition of Balkan peoples has been considerably changed and the population in many regions has been replaced by newcomers who have different psychological type, often – different dialect and sometimes even different language. Proceeding from this, population has been mixed and various ethnical and ethno-biological processes have occurred. In course of the time the ethnical structure and population composition in particular regions have been changed and a new cultural and ethnical amalgam has been created. (Cvijić, 1922a: 3–4).

The both studies cited above are the base of my analytical synthesis of the methodological and theoretical contributions of Jovan Cvijić and his findings on Balkan migratory movements in the next paragraphs of the paper.

Cvijić's methodology of studying migration and origin of population

According to Cvijić the greatest and most important migrations of all Balkan peoples start after Ottoman invasion on the Balkans. These migrations are different from the previous medieval population movements in their characteristics and significance which they have regarding ethnical composition: *There are regions which had been densely populated before Turkish invasion and after migration they became quite sparsely inhabited; often in such villages one can find ruins of buildings and abandoned and demolished churches and towns, which are covered with roots and bushes and where woods are grown. Other regions which now are populous, in the past were covered with difficult to pass forests which were cleared and settled... Old population was migrated or was assimilated by newcomers (Cvijić, 1922a: 2).*

Cvijić distinguishes great from small migrations. The first refers to the mass migration, often far away the homeland; they are well documented. The small but long-lasting drifts of population are more interesting for

him. These movements take place *not in the form of readily documented migration of thousands of families, but as almost imperceptible and rather individualistic relocations* (Allcock, 2000: 159). Generally, the departing people did not move away their homelands; if they did, such movement would occur in course of time and gradually. These small, but long-lasting migrations are seen by Cvijić as the main subject of his investigation. In this respect, he defines several research tasks, concerning the causes for migration, the number of migrants, the directions of their movements and their territorial allocation, the effects of their settlement on old native population, the ethnographic processes which occur in result of migrations in the new land, as well as in the homeland (Cvijić, 1902: CLXIV; Cvijić, 1922a: 8). In order to solve these tasks he argues that fieldwork and direct observation are the most reliable methodology: *It is necessary to examine the population on the field, from village to village, from house to house, in all our regions, and to verify these data through all other sources* (Cvijić, 1922a: 8).

Studying particular village, researcher should examine and describe in details origin of each family, whether it is aboriginal or it has come from another closer or more distant place and region. He can rely on memories and knowledge of old and sober-minded people who can give an account of stages and periods of new settlers' comings in the village. It is necessary, Cvijić claims, to investigate all villages for which there are evidences they are inhabited by people coming from the same family, *zadruga*, tribe or native village. The visits and fieldwork among the relatives and other people remained behind in the homeland is also part of research strategy and methodology, because in the most cases they have knowledge about the movements of individuals or families out of the village, their directions and even the names of the villages where they settled. On the other hand, the real danger of misleading information, especially in the case of studying migrations in more distant times is also noted by Cvijić. Then researcher must verify oral information through other sources (Cvijić, 1902: CLVI–CLVIII).

Further Cvijić lists some other indirect methods which can be used in the study of the origin of population and migrations, based on some ethnographic characteristics: types of villages, manner of construction and disposition of the houses; the domestic and family order and relationships, peculiarities of the folk customs and folk attire, dialect forms, toponomy etc. According to his opinion, however, researches based only on ethnographic characteristics are not enough reliable because of their insufficient studying in any particular region, and because in most of the cases of individual and small group migrations the migrants assimilate in the environment (Cvijić, 1902: CLIX–CLXIV, see also Cvijić 1896).

Theoretical ideas and findings

In order to distinguish and describe more accurately the slow, gradual, long-lasting and secular migrations of low intensity, usually in small groups, the phrase *metanastazička kretanja* /metanastatic movements/⁵ is coined and introduced by Cvijić. They have various directions – when one plots them on a map he can produce synthesis of so called *metanastasičke struje* /metanastatic drifts or flows/. These drifts have run for centuries from *zemlja matica* /a homeland/ to *zemlja kolonizacija* /a land of settlement/. Besides, often people left their homeland do not go directly to the place of settlement – they remain for shorter or longer period of time in *prelaznoj zemlji* /transit lands/ (Cvijić, 1922a: 4).

These migrations, excepting some cases, take place gradually and, besides, migratory drifts have flown for centuries from one homeland or tribe to the same lands of settlement (Cvijić, 1922a: 4–5). Cvijić argues that in most of the cases a drift runs after initial movements of scouts who explore and choose suitable new lands. Sometimes individuals go to their relatives, pioneers who have left the homeland earlier and inquire for living conditions and estimate the opportunities for coming of other his relatives and/or compatriots. In the most cases firstly only a part of the *zadruga* (south Slavic extended family) moves into the new-found home, and often on a temporary basis over a few seasons, before to be divided or re-formed in a new base (Alcock 2000: 159–160). Thus, the pioneers and earlier migrants play the role of migratory bridge; they are the mediators, who receive the newcomers and help for their settling or direct them to adjacent suitable lands for colonization.

The directions and length of the movements are dependent in large extent on geographical factors and relief features. In Serbia (which is the best examined part of peninsula by him and his followers) the most rivers flow northwards and the main ridges are orientated in direction north-south; this relief features determine the same direction of movements. On the base of the fulfilled fieldwork and collected data, bringing geographical and all other factors (most of which are historical in nature) several metanastatic drifts on the Balkans are defined by Cvijić and the causes and motives of migrations, as well as their aftermaths are examined by him.

Metanastatic drifts

In the western and central part of the peninsula he specifies following metanastatic drifts, which in course of the time set up the population's compo-

5 He borrows the Greek *μετανάστασις* which means leaving the homeland and changing the place of living.

sition: Dinaric, Kosovo-Metohian, Vardaro-Moravian, Timok-Braničevo and Shopp. In different parts of Serbian lands different drifts were predominant. Dinaric was the most powerful due to the number of people, as well as to the areas which it covered. Dinaric population from Hercegovina, Montenegro, Pešter plateau, Sijenica valley populated Šumadija, Stari Vlah, Podrinje, Valjevo and also Bosnia and Dalmatia; in the valley of Velika Morava it intersected with Vardaro-Moravian and Shopp drifts. In the whole area westward the line Avala-Kosmaj-Crni vrh the Dinaric population predominates, for instance around 80% of population in Šumadija according to Cvijić's data had dinaric origin (Cvijić, 1902: CLXXXI–CLXXXV; Cvijić, 1922a: 2, 5–7). The Kosovo-Metohian were the oldest drift running through the valley of Morava populated in large extent the area between Niš, on south, and Zaječar, on north. During its earliest stage migrants from Kosovo and Metohija had settled also in Šumadija, Podrinje and Valjevo (Cvijić 1902: CLXXXVIII; Cvijić, 1922a: 7–9). The Vardaro-Moravian drift consisting of population from Macedonia ran mainly to the valley of Morava, where it intersected with the previous two drifts. These settlers came in the place of the population that migrated after the Austrian-Turkish wars. Some went northward reaching the area around the confluence of Morava and Danube (Cvijić, 1902: CLXXXVI–CLXXXVII; Cvijić, 1922a: 9). The Shopp drift came from the territories of South-eastern Serbia, Western Bulgaria and North-western Macedonia. Shopp population also settled in the valley of South Morava and its tributaries; a smaller part went to Šumadija and even Beograd and Smederevo (Cvijić 1922a: 11). Timok-Braničevo drift carried away the population of Timok valley which crossed the Danube and Sava and settled in Romania, Hungary and even Ukraine (Cvijić, 1922a: 9–11). These groups who settled in more distant lands and among population which is very different in socio-cultural terms are called by Cvijić 'exotic oases of population' (Cvijić, 1922a: 11–12).

The common of all of these drifts is that they ran from south to north during the whole Ottoman period. In result of mass Serbian migrations after Austrian-Turkish wars during XVII and XVIII century big masses of people moved northward crossing the Danube and Sava. The population losses were compensated through movements of people from the south areas who settled in the abandoned settlements and houses. They left the less secure and closer to the big Ottoman administrative centres southern areas and went to the more peaceful outlying northern areas (Cvijić, 1902: CLXV–CLXVI; Cvijić, 1922a: 27–29). This direction held even after Serbia liberation, because the northern regions were firstly liberated; the established state became attractive destination for Serbian population from

other (south) regions, remained under Ottoman rule (Cvijić, 1902: CLXVII; Cvijić, 1922a: 32–33). In result of the liberation, however, a new drift appeared – it ran from the territories northward Danube towards Serbian state: Cvijić is conscious of it and discuss these called by him *inversne seobe* /inverse migrations/ (Cvijić, 1922a: 21–22).

The Cvijić's data concerning such movements are the most detailed namely in case of these Balkan areas, 'populated by Serbs'. About the other parts of the peninsula he has less sources and evidences and because of that his explanations and conclusions are not so deep and profound.

Very shortly he describes the movements in the eastern part of the Balkans. He argues that Bulgarians are less mobile because of their closeness to Ottoman administrative powers; the significant number of Turkish population in each part of Bulgarian lands; their mental characteristics. There were smaller and short-distance internal migrations from one vilayet to another and from one village to another. He makes more reference to population's movements from the mountains of Stara planina and Sredna gora to the Danube valley, sea-shore of Black sea and catchment-basin of Marica (Cvijić, 1922a: 13–16).

In Epiro-Albanian areas the drifts of *Malisor*, *Dukadjini*, *Skumbi* and *Toska* are determined by him. The Malisors and Dukagins populated Kosovo and Metohija; the latest reached the valley of South Morava. The Albanian population coming with the Skumbi drift settled in Western Macedonia. The last drift, Toska, ran to middle Greece and Peloponnese (Cvijić, 1922a: 16–18).

Migrations in the Aegean area also were less intensive. Only small groups went to north; more powerful were the movements from north to south – besides the massive Toska drift many others coming initially as shepherds and *pečalbari*⁶ (Slavs, Aromanians, Albanians) settled in the area between Thessaloniki and Alexandroupoli. There were also population transfers between continental Greece and Asia Minor and Aegean islands. The trade relations and movements between Aegean and Black sea area are also mentioned by Cvijić (Cvijić, 1922a: 18–20).

Causes and motives for migrations

Writing of causes and motives of described metanastatic drifts Cvijić notes that they are diverse and often interlaced. Each metanastatic case must be

6 In the traditional Balkan cultures *pečalba/pečalbarstvo* is a seasonal (male) labour mobility, which could be connected to a broad range of economic activities in the agricultural sector (farm work, harvesting) and in a number of specific crafts (different construction works, masonry, pottery, etc.) (Palairret, 1987: 25–37).

examined separately in order to outline distinctive set of causes. Nevertheless, the different causes are classified in three large groups: historical, psychological and economical. The historical causes proceed from the historical context and developments, such as: the Ottoman conquest of the Balkans; the creation of Janissary corps, Austrian-Turkish wars, rebellions against ottoman rule, the Kardžalias' unrests, the religious persecutions, the wars of liberation (Cvijić, 1922a: 24–34). The emergence and changes of political borders on the Balkans in the course of the Ottoman Empire's dissolution and the expansion of the liberated Balkan national states are also marked by Cvijić as cause for population movements, as well as the development of new communications: for instance, many people moved and settled near railway stations (Cvijić, 1902: CLXXI–CLXXII).

Economical causes are also determinative for migratory movements. Groups migrated from economically weak regions to regions which hold out better economical and living conditions, from areas with less plentiful to more reliable grazing ground, from less fertile arable areas to more productive lands, from densely populated highland regions with little living space to spacious lowlands and plains. Seasonal migrations also produce permanent leaving of the homeland – in the case of shepherds' seasonal movements often shepherds got accustomed to milieu of their summer pastures and settled there, establishing new village; *pečalbari* (builders, masons, stone-cutters and other different craftsmen, as well as agricultural workers (harvesters, mowers, gardeners), sometimes settled in the places where they had worked by then seasonally. Furthermore, Cvijić pays attention to climatic variations: dry summers, severe winters and lean years, as well as big floods were other important factors causing metanastatic movements of population from one to another place (Cvijić, 1902: CLXVIII–CLXX; Cvijić 1922a: 32–33). He does not omit to notice migrations, influenced by different accidental causes: blood feud, diseases and even in result of superstitions (Cvijić, 1902: CLXX, CLXXI).

These historical and economical causes are tightly interlaced with the psychological motives: troubles and inconvenience of the people or their proud mentality were decisive cause for movement. The importance of migratory habits' establishment is also pointed by Cvijić – often in places, where all these causes had made long-lasting impact, a specific aptitudes for migration were established (Cvijić, 1922a: 23–24).

Aftermaths of metanastatic movements

In a separate section the effects and aftermaths of the long-lasting metanastatic movements and concomitant transformation processes are dis-

cussed by Cvijić. He examines these processes classifying them in three groups – adaptation to the new geographical environment, social and ethnical adaptation and transformations in result of ethno-biological processes: *these transformations do not occur simply or independently of each other, but they merge in various ways* (Cvijić, 1922a: 46).

In order to make easier their geographical adaptation, people use different strategies: they seek lands whose relief and natural conditions are at any rate similar to these in their homeland; usually oldest settlers settle in the same place or close to abandoned ancient villages and around them newer migrants settle; colonists carry the geographical names and toponomy to the new living areas, they call the village or at least a quarter (if there already lived people) with the name of their home village (Cvijić, 1922a: 46–52).

The social adaptation depends on several factors. The number of aboriginal population and their assimilative power are significant. In the course of time newcomers adopt old local attire, dialect, customs, habits, etc., and become almost indistinguishable from local aboriginal population. However, always there is some kind of change and influence on local social and cultural patterns. If aborigines are very few, they adopt more of migrants' socio-cultural peculiarities. In this context the number of colonists also matters. They adapt more easily and quickly to the new social (and natural) environment when they come step by step and in small groups. In Cvijić opinion, adaptation also depends on settlers' mentality: *Undoubtedly there is ethnic factor which determines the speed and depth of assimilation of the different ethnic groups* (Cvijić, 1922a: 57). The distance between homeland and new destination also is a very important factor – when migrants are far away from their homeland and do not have connections with it, they more quickly adapt and are assimilated in the new environment (Cvijić, 1922a: 52–62).

Together with geographical and social adaptation intensive ethno-biological processes evolve. Although mixed marriages in the first generation after migration are rare, especially when the aboriginal population and the particular settlers' group are completely different, gradually, in the next generations, differences decrease and mixed marriages between old local population and newcomers, as well as between settlers coming from different region (and in different period of times), became mass phenomenon. This mixing accelerates the process of adaptation because families with different origin connect through kinship. Furthermore, in result of crossbreeding it comes to peculiar biological standardization. *Because of these processes in the area of strong colonisation new ethnic groups, varieties and*

types emerge. This development covers the all metanastatic areas, but in the first place Serbia, Dalmatia and Slavonia (Cvijić, 1922a: 62–84).

INSTEAD OF CONCLUSION: CONTROVERSIES AND CONTRIBUTIONS

During the last few decades the image of Cvijić and his work is contradictory, fluctuating between glorification, critical interpretation and full repudiation (Prelić, 2014: 91). For instance, Milisav Lutovac claims that Cvijić's approach is beyond dispute; in his opinion, even in the socialistic conditions of new movements and migration flows, Cvijić's ideas can and should be further developed, of course with regard to the new social conditions (Lutovac, 1987). However, some of Cvijić's ideas and statements are very disputable or at least threadbare. Mladena Prelić argued that Cvijić's followers have not sufficiently developed further his concepts and methods of studies in culture and migration and that they oversimplified ethnology to 'collecting material for its own sake' (Prelić, 2014, 93). Maybe the most criticized is his methodology of examination and criteria of division of the psychological types and varieties on the Balkans (Kovačević, 1980), seen also in the terms of Romanticism (Kovačević, 2001: 27–44; Pišev, 2010: 61–63).

Besides the methodological deficiency, there is a reasonable criticism of his partiality to the 'Dinaric type', to which in great number the Serbs belong⁷ (Prelić, 2014, 91). Similarly, discussing migrations Cvijić focuses again on Dinaric drift, which he sees as the most powerful and determinative for the composition and socio-cultural characteristics of population in the central and western part of Balkan peninsula, from Macedonia, on south, to Dalmatia and Slovenia, on north (cf. Pišev, 2010: 63–63). Although he closely follows positivism and empiricism in his research methodology, his direct observations and fieldwork covers mainly mentioned above territory, whereas southern and especially the eastern part of the Balkans remain unexplored fields and data and sources about migrations with which he operates are disparate and beyond comparison. Because of that and due to the newer empirical data and researches many of his generalizations (the inherent immobility of Bulgarians and Greeks, for instance) are out-of-date and refuted.

Positivist paradigm combined with ethno-genetic definitions on Slavic and Balkan origins, territorial distribution of 'psychological types',

7 Some authors see in his work concealed promotion of (great) Serbian nationalism and (see Milenković, 2008; Pišev, 2010; Pišev, 2013).

mappings and ethnic categorizations established in practice not only a scientific, but also a political platform for population and migration issues (Lukić Krstanović, 2014, 17). Here we can find another controversial element of Cvijić approach in the study of migratory movements of population. He was one of the intellectuals in the end of 19th and the beginning of 20th century who had influence not only in science, but also in public sphere and political issues. Cvijić participated in Serbian diplomatic missions during the World War I and was a chairman of Historical-ethnographic commission dealing with territorial issues as part of the Serbian delegation to the Paris Peace Conference. He helped to determine the state borders of the new Yugoslav state (the Kingdom of Serbs, Croats and Slovenians), using his research in human geography and ethnography in the negotiations; his data and findings were used in determining the ethnic space of the South Slavs and promoting the Yugoslav ideology. Thus, in certain cases the science was used as a tool of political strategies (Trgovčević, 1986, 6).

In this context his researches and conclusions about metanastatic movements have an important role: in the result of these intensive and long-lasting migrations Serbs coming from different regions and various tribes were mixed; and what is more, Cvijić claims that in the course of the movements and in result of 'ethno-biological processes' Serbs, Croats and Slovenians mixed and a process of socio-cultural integration and unification of these three 'south Slavic' peoples started and evolved. Thus, he strengthens arguments for establishment and further growth of Yugoslav identity, but in the frame of Serbian hegemony (Pišev, 2010, 64–74).

On the other hand, Cvijić's great and durable influence on human geography and ethnology and particularly on migration research cannot be neglected and disregarded (Prelić, 2014: 83). His scholarly legacy is still waiting for its scientific, analytical and critical scrutiny (Lukić Krstanović, 2014, 17). Here I will point some contributions which I consider as important.

As a result of his and his followers' research work was collected (with one and the same methodology) and published enormous fieldwork data and materials about settlements, origin of population and migrations. The investigations covered not all, but yet wide areas of the Balkan peninsula – nowadays territories of Serbia, Montenegro, Macedonia, Bosnia and Herzegovina, Croatia, Slovenia. The intensive detailed fieldwork combined with careful exploration of other written sources, which is representative of Cvijić's school, is an important methodological premise of each contemporary ethnological research of migrations.

His intension to study each settlement of mentioned above wide territory is naive from today's point of view, but it is easy to be explained if we reckon with the inherent for the epoch positivist approach. However, his appeal for investigation of both – the place of origin and the places of settlement is another tool which is indispensable in modern research methodology of human movements' examinations. For instance the very popular today migration network theory and transnational theory postulate the same – the causes and consequences of human movements should not be studied separately. Migration modify both – sending and receiving area and because of that its effects and aftermaths cannot be properly understood by studying only migrants, but also requires considering the people left behind in the homeland (de Haas, 2008, 26–27).

The attention to (extended) family household is also important in an ethnological research on migration. The family household is that unit of analysis, which mediates between the individual strivings and actions and the larger structural setting and conditions (Boyd, 1989, 645); the choice of the household as the primary unit of analysis is seen by many researchers as a kind of optimum strategy or a compromise between actor and structure approaches (de Haas, 2008, 38).

Referring to Cvijić's theoretical approach we can also find some interesting suggestions and contributions. Usually, the work of another geographer, the Briton Ravenstein, is pointed out as the first scholarly contribution to the migration theory. His articles (Ravenstein, 1885; Ravenstein, 1889), in which he formulates 'the laws of migrations', are among the most cited during the 20th century Ravenstein claims that the major causes of migration are economic. Migration patterns are further assumed to be influenced by factors such as distance and population densities (Skeldon, 1997, 19). People move from low income to high income areas, and from densely to sparsely populated areas. Almost at the same time Cvijić develops his model, which seems to me more elaborate and complex. As we saw he focuses not only on economic reasons, but he takes into consideration many other social, cultural, natural and psychological⁸ factors and puts them in the overall historical and social context. Thus, he comes closer to the much later (revising the Ravenstein's laws) and still actual push-pull framework (see Lee, 1966).

I consider as interesting the Cvijić's notion 'metanastatic movements' in his ambition to distinguish slow, gradual, durable, a place-

8 Even today migrants note some geographical factors among the causes for their decision of destination – for instance, many Bulgarian immigrants in Spain and Italy say that the similar climate and natural conditions, as well as the similar human temperament and mentality were determinative for their coming and settlement there.

to-place human movements. The notion refers neither only to forced migrations, nor only to economical migrations, but includes the both. Furthermore, he points also to that which nowadays we call ecological and climate migrations.

His concept of metanastatic drift or flow is similar to some ideas of the network theory and the notion of 'chain migration'. The latter presumes that the choices made by pioneer migrants tend to have a great influence on subsequent migration patterns. Already settled migrants function as 'bridgeheads', reducing the risks as well as material and psychological costs of subsequent migration. Through the assistance of relatives, new migrants may more easily adapt and integrate in the new place of residence (de Haas, 2008, 19). Therefore, the formation of an established migrant community at one particular destination will increase the likelihood of subsequent migration to that particular place (Appleyard, 1992). The Cvijić's statement that in places, where the migrations have made long-lasting impact, a specific aptitude for movement is established, is not difficult to be read as a presage of defined in details by Douglas Massey concept of 'culture of migration', according to which, migration induces changes in values and cultural perceptions, transforming social and economic structures that make additional migration likely migration (Massey et al., 1993, 452).

These are some of Cvijić's controversies and contributions made at the dawn of migration research in Europe, moreover analyzing field data, collected in the Balkans. Their critical examination in proposed here line can lead to some interesting possibilities and findings; it is worthy of being further developed.

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JOVAN CVIJIĆ AND ETHNOLOGY / ANTHROPOLOGY IN RUSSIA

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ABSTRACT: Jovan Cvijić is well-known in Russia, to a large extent owing to the interest in his work taken in the second half of the 20th century by one of the best known Russian ethnologists, Sergei Tokarev. In 1962, Tokarev published an article about Cvijić in an anthology entitled "The Slavic Archive". Later, in 1978, the same author wrote a textbook for students who major in ethnography, "The History of Foreign Ethnography", with a large section dedicated to the works of J. Cvijić. According to Tokarev, the anthropogeographic method, developed by Cvijić, is considerably better than Ratzel's. Tokarev credits Cvijić with managing to combine the viewpoint of a geographer with that of a historian. This idea has greatly defined the appearance of ethnoecological studies in Russia. The cultural and geographical classification of regions of the Balkan Peninsula developed by Cvijić, the so-called "civilization zones", is to a certain degree similar to the concept of "economic and cultural type and historic-ethnographic province" proposed in the 1950s by Russian scholars M. Levin and N. Cheboksarov.

Key words: Jovan Cvijić, history of science, anthropogeography

JOVAN CVIJIĆ AS A WELL KNOWN SCHOLAR

Jovan Cvijić (1865–1927), born 150 years ago, was a world-level scholar. His contribution to world scholarship is widely recognized, which is witnessed by the fact that, in addition to having been the rector of the Belgrade University, founding its Geographical Society and serving as this Society's permanent president up until his death in 1927, and to having been the member, and then President, of the Serbian Royal Academy, he was also elected as member of seven other Academies of Sciences and sixteen societies for

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geography and natural history all over the world. He was awarded medals in the United States, France, and Great Britain; his merits were celebrated in Athens, Budapest and Bucharest; he was a doctor *honoris causa* of Sorbonne and of the University of Prague. The Academy of Sciences of the USSR was among the academies that granted him membership.

In Russia, the name of Jovan Cvijić is widely known, to a large extent thanks to the interest in his work taken in the second half of the 20th century by one of the most famous Russian ethnologists, Sergei Tokarev. In 1962, he published an essay titled "Prof. Jovan Cvijić (Acknowledging the 35th Anniversary of His Demise") (Tokarev, 1962, 95–116) in "The Slavic Archive", an anthology of articles. Later, in 1978, the same author, S. A. Tokarev, wrote "The History of Foreign Ethnography" (Tokarev 1978, 168-169), a tutorial for students who major in ethnography, a section in which is dedicated to the works of J. Cvijić. According to Tokarev, the anthropogeographic method developed by Cvijić is considerably different from – and better than – the method of the same name designed by Friedrich Ratzel. Tokarev credited Cvijić with having skillfully combined the point of view of a geographer with that of a historian.

As Tokarev wrote, Cvijić, in his numerous works but especially in his fundamental study, "The Balkan Peninsula", uses convincing examples to show the important, and at the same time historically changing, role of geographic landscape in the distribution of population, its subsequent relocation caused by historical reasons ("metanastatic relocations"), its economic methods and cultural setup. The cultural and geographic classification of various regions of the Balkans, the so-called "civilization zones" (something similar to the "historico-ethnographic provinces"), developed by Cvijić, is of great interest. Cvijić's experience in classifying types of urban and rural settlements in the Balkan countries, as well as of traditional building types, is very interesting too, though his attempts at "delimiting" the "psychological types" characteristic for the inhabitants of particular countries and provinces of the peninsula do not seem convincing (Tokarev, 1978, 168).

In Tokarev's judgment, the working methods of Jovan Cvijić, based on the most detailed and thorough historical research of each particular locality remain traditional for Serbian ethnography up till now. Tokarev admired the fact that Cvijić or his students have perhaps strolled all over each and every inhabited place in the Balkans during the long year of studies! (Tokarev, 1978, 169). Although Tokarev a little bit exaggerated the territory studied by Cvijić (he was doing his research predominantly in the South Slavic territory not in the whole Balkan peninsula), Tokarev

correctly understood the influence of Cvijić ideas and methods to Serbian ethnography. According to Tokarev, the fundamental series, "Settlements and Origins of Population" ("Naselja i poreklo stanovništva"), founded by Cvijić, has turned into a real library of theme-specific monographs about particular settlements in Serbia and its adjacent lands. Among Cvijić's disciples and followers, Tokarev lists Jovan Erdeljanović, Borivoje Drob-njaković, Branislav Kojić, Milenko S. Filipović, Mirko Barjaktarović, Petar Vlahović and others (Tokarev, 1978, 169).

THE INFLUENCE OF CVIJIĆ IDEAS ON RUSSIAN ANTHROPOLOGY IN THE FIRST DECADES OF THE 20TH CENTURY

Without any doubt, the scholarly ideas of Jovan Cvijić have left their mark on Russian science and scholarship, too. His specter of research was very wide: it included geography, ethnology, social psychology, and so on. Being an ethnologist myself, I would like to explore his influence on ethnology/anthropology, or, to be more precise, on the Russian version of anthropo-geography, in the first place.

It should be mentioned here that tight intertwining of ethnological and geographical studies is rather common for the Russian scholarly tradi-tion. Ethnography's being closely connected with geography is illustrated, in particular, by the fact of a joint subdepartment of geography and ethnog-raphy having been established at the Historico-Philological Department of the Moscow University back in 1884. It was chaired, since the day of its establishment and up till 1922, by a prominent Russian ethnographer, ar-cheologist, and museologist Dmitry Nikolaevich Anuchin (1843–1923). He is rightfully credited as the initiator and founder of thorough geographic, anthropologic and ethnographic studies at the M. V. Lomonosov Moscow State University (Kadek, 1940, 27-28). Russian scholars' interest in an-thropogeography during the first decades of the 20th century is witnessed by the translation of leading foreign anthropogeographers into Russian during that period. During the first years after the October Revolution, many Russian scholars were following the same school of thought. Among them one could mention a prominent representative of the Moscow school of geographers, founder of Russian karstology, director of the Moscow State University's Research Institute for Geography in 1921–1927, Alex-ander Alexandrovich Kruber (1871–1941) (Kruber 1922, Kruber 1930) and a distinguished teacher of geography, author of many textbooks for secondary and tertiary school L. D. Sinitsky (1864–1933) (Sinickij, 1909; Sinickij, 1923). Kruber authored the experience of geographical zoning of

European Russia. He showed, very graphically, the role of human activities in the life and appearance of landscapes. According to A. Kruber, anthropogeography studies "humankind, and facts and phenomena of human life, in their spatial arrangement and interaction with geographical facts and phenomena"(Kruber, 1930, 108). In the Great Soviet Encyclopedia (1930) A. Kruber introduced anthropogeography as the "part of geography that researches land as a human habitat" (Kruber, 1930: 108).

According to another Russian geographer, L. D. Sinitsky, anthropogeography has revealed the influence of geographic factors on the historical and cultural development; proved that humans do not become less nature-dependent with the growth of their culture; and ascertained that nature only makes things possible, while it depends on the human's cultural level whether he will use those possibilities or not. Unlike F. Ratzel, Kruber and Sinitsky recognized the objective existence of geographic shell, and marked out the anthroposphere as one of its components (Kruber, 1922, Sinitskij, 1909). In 1928 a book by a prominent ethnographer and linguist, who specialized in the languages of the Extreme North of Russia, Vladimir Germanovich Bogoraz (a. k. a. Waldemar Bogoraz in the West) came into the world. Titled "Distribution of Culture Across the Earth. Introduction into Ethnogeography", it, too, shares some of the anthropogeographic approach (Bogoraz-Tan, 1928). During the same period, another Russian scholar, Veniamin Petrovich Semenov-Tyan-Shansky, was also developing original concepts of anthropogeography and political geography. (Somewhat earlier, in 1911, one of his monographs was honored with a gold medal at the World's Fair in Turin.) Semenov-Tyan-Shansky analyzed the typology of rural population settlement patterns, which he linked to natural conditions. At the same time, he also suggested ideas on the country's zoning based on economic factors (rates of commercial and industrial turnover, population density, etc.) (Semenov-Tyan-Shanskij, 1928).

Russian scholars' interest in anthropogeography in mid-20th century

Later on, a more socially oriented trend became dominant in the studies in Russia. Humankind was now considered as a "social organism", and human's interaction with nature was viewed in the same framework. In the 1930s, the development of anthropogeography in the USSR was interrupted. It was listed among the "bourgeois sciences". Ethnography's link with geography was now much weaker, mainly because of the ethnographers' turning to the study of social factors. Anthropogeography was criticized for its presumed lack of economic approach, and for anthropogeographers' neglecting to study the modern society and not trying to see the contradictions between

nature and the society. Indeed, they believed that everything in the world was caused by natural factors, and that it was geographic environment that forced humans to choose this or that occupation (Kushner, 1951). In mid-20th century Prof. Pyotr Kushner, head of the ethnic statistics and cartography division in the Institute of Ethnography of the Academy of Sciences of the USSR, reproached the anthropogeographers for their unnecessary absolutization of the landscape's influence on the appearance of "one or another social structure" and "ignoring social factors". According to him, "the social factors are... so important, that, in addition to determining the forms of human society, they also affect the surrounding landscape... The new appearance of cultivated territories reflect, to a considerable degree, the ethnic peculiarities of human groups: one might say that territories acquire ethnic flavor" (Kushner, 1951, Ignat'ev, 2004). In the words of another Russian geographer I. M. Zabelin et al., anthropogeography has overestimated external factors, including the influence of geographic environment, in the development of human society (Zabelin, 1989).

At the same time, ethnicity was closely linked to territoriality in the Soviet Union throughout the whole of its history, because the state itself consisted of ethno-territorial formations of higher or lower rank, such as union and autonomous republics, *krai* (territories), etc. Among the classifications of peoples and cultures conventional for Russian scholarship, their geographical classification occupies an important, if not the chief, position. This can be seen, for example, from the systematization principle applied in the works published by the N. N. Miklukho-Maklai Institute of Ethnology and Anthropology, such as the 1960s many-volumed set "Peoples of the World", the 20-volumed encyclopedia "Countries and Peoples" of the 1980s, and many other titles. (By the way, the book about the peoples of Yugoslavia from the "Peoples of the World" series, co-authored by scholars from both countries, was also published in Serbian in Belgrade.) In spite of anthropogeography's ceasing to exist as a school of studies in Russia, quite a number of ideas that pertain to human's interaction with nature continued. For example, ethnic cartography was developing successfully in the ethnography of the Soviet era. Maps and atlases were published that showed the territories inhabited by various ethnic groups. From the methodological point of view, the doctoral thesis by P. Kushner, "Ethnic Boundary and Ethnographic Territory", defended in 1947 and published in 1951, was of great importance.

Starting from the 1950s, the problem of economico-cultural classification of humankind was being discussed as a methodologically important matter. This caused the emergence of the so-called theory of economic and cultur-

al types and historico-ethnographic provinces. An economic and cultural type, or ECT, is a complex of economic and cultural features that establishes historically among various peoples that share the same or close phases of their social and economical development and inhabit similar natural and geographical environments. A "historico-ethnographic province" is a concept considerably resembling the cultural and geographic classification of various regions of the Balkans, developed decades earlier by Cvijić, for which he has coined the term "civilization zones". The Russian concept was co-authored by a number of Soviet scholars, both ethnographers and archeologists. It was formulated most completely in 1955 by two scholars from the Institute of Ethnography of the Academy of Sciences of the USSR, Maksim Grigoryevich Levin and Nikolai Nikolayevich Cheboksarov, in their jointly written article titled "Economic and Cultural Types and Historico-Ethnographic Provinces" (Levin & Cheboksarov, 1955). According to the authors, elements of the former category are functionally connected with natural environment; they bear no ethnic stamp, and their coincidence in two or more peoples is not indicative of these peoples' ethnic relation. On the other hand, elements that belong to the second category, while not necessarily pointing to ethnic kinship, witness the peoples' historical contacts that can be traced both chronologically and territorially. In other words, "different peoples in different regions, even those very distant from each other, can develop the same economical and cultural type, if they live in similar geographical environment" (Levin & Cheboksarov, 1955: 6). Contrariwise, representatives of different peoples who live adjacently form cultural community as a result of continuous connections with each other, mutual influence, and common historical destinies. A specific territory, in which such a community has established, is called a "historico-ethnographic province" by the authors of the concept.

Discussions about Ethnogeography in the second half of the 20th century

During the 1960s and 70s, too, the merits and demerits of anthropogeography were actively discussed within the Institute of Ethnography. A number of publications appeared that were dedicated to this problem. At the same time, Soviet ethnography was seeking to underline its distancing from the anthropogeographic tradition. In 1963 the "Soviet Ethnography" journal published "On the Subject and Tasks of Ethnogeography" (Bruk, Kozlov & Levin, 1963: 12), an article by S. I. Bruk, V. I. Kozlov and M. G. Levin in which they criticized the works of F. Ratzel and the "human geography school". In another article a decade later, V. I. Kozlov and V. V. Pokshishevsky wrote that their recognition of "influence of geographic

factors on various processes and phenomena studied by ethnography" did not mean "any recurrence to the anthropogeographical concepts" (Kozlov, Pokshishevskij 1973: 3-13). "Ethnographic maps" were also discussed, being used, in the thought of that time's ethnographers, for establishing political borders and substantiating the states' claims for certain territories. (This is connected, first of all, with the period of the Balkan Wars, World War I and later decades.) The theme of ethnic borders, ethnic territories, mixed populations, etc. was part of the period's polemics (Kozlov, 1971; Bruk, 1964; Andrianov, Kozlov & Bruk, 1978).

During the second half of the 20th century, Lev Nikolayevich Gumilyov (1912–1992), a Russian scholar, a man of encyclopedic learning and a hard fate, made an important – though not easily recognized by all – contribution into the study of culture's dependency on the geographical factor. Son of two famous Russian poets, Anna Akhmatova and Nikolai Gumilyov, L. Gumilyov authored the doctrine of humankind and ethnoses as biosocial categories. His theory is founded upon the assertion of "ethnoses" being biological organisms with clearly distinguishable periods of youth, maturity, and senility. Creating his concept, Gumilyov directly linked ethnic groups' formation to their habitats (Gumilev, 1990). In his last work, "From Rus to Russia: Essays in Ethnic History", he studied the historical way of Russia proceeding from its geographical location and the interaction of European and Asian worlds. He assigned an important part in ethnogenesis to landscape and to ethnic surroundings. L. N. Gumilyov stressed that space affected the nature of the forming culture and the peculiarities of its interaction with its neighbors (Gumilev, 2003).

Anthropogeographic idea has, to a great degree, predefined the emergence of such a school of studies in Russian scholarship as ethnoecology. It is also termed "anthropological ecology", "social ecology" or "human ecology". Ethnoecological studies are based on the concept of the world as a unified and integral system that exists in the "society–nature–economy" triad. The subject of research the interaction of the society (historico-cultural communities) with the surrounding or natural environment. Works of this type began in Russia with the study of the long-livers in the Caucasus in 1970s, associated with the name of Victor Ivanovich Kozlov (1924–2013). Later, in the 1980s and 90s, he guided the works on the project titled "Ethnic Ecology of Resettlement Groups. Russian Old Settlers in the Transcaucasia" at the Institute of Ethnography. The project focused on researching how ethnic Russian peasants, who have migrated to Transcaucasia during the past few centuries, adapted to the living conditions there. The works were complexly themed, including the study

of demographical, medico-anthropological, and psychological features of old-settling Russian groups, their consort behavior and family structure, traditional and modern dietary patterns, specifics of their settlement, peculiarities of their residence and dwellings, economical activities, spiritual culture and social structure of their confessional communities. The many years of studies have resulted in a series of monographs and anthologies written, and still being written, based on the materials collected in the expeditions (Russkije, 1992; Russkije, 1995; Kozlov, 1994).

Jovan Cvijić's views and new scientific ideas in modern Russia

The development of theoretical and methodological principles of ethnic ecology as an interdisciplinary field of studies continues nowadays, in the early 21st century, with tasks and ways of practical application of ethnoecological knowledge and research methods still being determined. Scholars like Anatoly Yamskov, Nadezhda Dubova et al. are working in this vein. One can second the opinion of A. N. Yamskov, according to whom studying the ecological aspects of economy and material culture or the medico-demographical features of the populace are the "cultural ecologists'" prevailing theme. Some of the ethnoecological appraisals that have been carried recently were ordered by international bodies such as the World Bank, the Advisory Committee on Protection of the Sea, UNESCO, etc. Others are often ordered by transnational companies engaged in the raw-materials branches of the economy in Siberia, Far East, and Northern European Russia. They are aimed at minimizing the negative impact of the companies' projects on the local bioresources. Works like this indicate the importance of getting professional ethnologists involved in the development of various economical projects. Some of the recent studies were dedicated, for example, to the sociocultural consequences of technological catastrophes, such as the disasters in Chernobyl and on the Techa River (Stepanov, 1999; Yamskov, 2006; Komarova, 2002; Antonova, 2012).

So, to sum up, it can be said that the branch of scholarship that studies human's ties and interactions with the environment is developing and improving both globally and in Russia in particular. In conclusion, I would like to mark out that the scholarly works of Jovan Cvijić are still retaining their topicality. Nowadays, a century and a half after his birth, his oeuvre is being studied, and in a thankful manner, by scholars of various specializations. It inspires and gives birth no new ideas. The interest towards Jovan Cvijić's views in modern Russia is witnessed, for example, by the publication of the Russian translation of an article by Serbian historian Branko Nadoveza, scholarly advisor in the Institute for Recent

History of Serbia (Institut za noviju istoriju Srbije), titled "Jovan Cvijić on the Ethnic Processes in the Balkans", in "Imagines Mundi: Almanac of the World History Studies Between the 16th and 20th Centuries", published in Yekaterinburg, in 2010 (Nadoveza, 2010).

Jovan Cvijić's name is known not only among scholars in Russia. Even the websites of Russian tour operators cite Jovan Cvijić's authority¹. For example, the Internet carriers numerous mentions of Cvijić's having called Sokobanja, one of the Serbian spas most famous in Russia, "Serbian Switzerland" for the beauty of its landscapes. In the "Travels" section, one can read in Russian about Jovan Cvijić as the discoverer and first explorer of Serbia's longest (it is 2.3 kilometers long) Rajko's Cave². We learn that, having visited all the lakes of the Durmitor in 1899, he also authored the first detailed description of the Pošćensko Lake³. Ads promoting real estate in Montenegro inform Russians that it was Jovan Cvijić who studied the origin and evolution of the Lake Skadar. According to his theory, the lake was once a sea gulf which, as a result of tectonic shifts and the formation of Mount Rumija, was separated from the sea and desalinated⁴. And would-be travelers to Serbia are told that the 500-dinars banknote bears a portrait of Jovan Cvijić, Serbian geographer, chairman of the Serbian Royal Academy of Sciences.

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REFLECTION OF JOVAN CVIJIĆ'S ANTHROPOGEOGRAPHIC WORK IN THE CZECH INTER-WAR ETHNOLOGY

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ABSTRACT: The cooperation with other social and natural sciences played an important role in constituting the Czech or Czechoslovak ethnology as a scientific discipline. In our contribution, we explore the cultural-geographic, or better said, anthropogeographic method represented by Jovan Cvijić's work in the Balkans. Our contribution is grounded on specialized literature and archival sources and we try to indicate who among the Czech ethnologists and geographers was influenced by J. Cvijić's work. We point out the First Congress of Slavic Geographers and Ethnologists in Prague in 1924, a socially and professionally important event. J. Cvijić was appointed the honorary chairman of this Congress held under the auspices of T. G. Masaryk, President of the Czechoslovak Republic. We have discovered how his work was reflected in the Czech lands as well as his contacts in Czechoslovakia in the inter-war period. J. Cvijić's method and work encouraged Czechoslovak geographers, anthropologists and ethnologists to research the relations among ethnic groups, and inspired them to draw up different maps of nationalities and to attempt to issue an ethnological atlas of traditional folk culture. His work was presented to the public by means of a collection of essays entitled *Balkánské otázky. Kulturní a politicko-zeměpisné stati* (The Balkans Issues. Cultural and political-geographical essays) (1924) and owing to this, the Balkan Peninsula was no longer a "terra incognita". J. Cvijić was member of the *Národopisná společnost československá* (Czech-Slavonic Ethnological Society) and holder of honorary doctorate awarded by the Charles University.

Key words: Ethnology, Czechoslovakia, Jovan Cvijić, Karel Chotek, Drahomíra Stránská

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INTRODUCTION

In our contribution, we pay attention to the influence of Jovan Cvijić's personality and work on Czech ethnology and the researchers who deal with this discipline as well as on his personal and scientific contacts in the Czech environment and the reflection of his scientific work in the specialized literature.¹

The cooperation with other social and natural sciences played an important role on constituting the Czech or Czechoslovak ethnology as a scientific discipline. In addition to history, literary and music science, an important position belonged to geography or its sub-discipline, anthropogeography, which focused on monitoring the cultural phenomena in the space, explanation of regional differentiation as well as looking for relations between the nature environment and the cultural phenomena (Vařeka & Plessingerová, 1999). One of the directions in ethnographic research, established in the European environment in the 19th century, was signed as a cultural and geographic one; besides German, Austrian and French researchers, it was Jovan Cvijić's anthropogeographic school that played an important role in its specific development within the Balkan cultural and nature area (Frolec, 1970–1971).

Since 1902, J. Cvijić (1865–1927) was in contact mainly with Czech geographers. In that year, he visited Prague as an applicant for the "proper chair of geography" after Professor Jan Palacký at Charles-Ferdinand University. At that time, a more regular contact between him and his school on the one side and the younger generation of Czech geographers on the other side began. His contacts with the Czech environment were even more intensive since the year 1912 as he started taking a cure in Karlovy Vary and made a regular break in Prague (Daneš, 1925).

THE CZECH-SLAVIC ETHNOLOGICAL EXHIBITION AND THE CONGRESS OF SLAVIC GEOGRAPHERS AND ETHNOGRAPHERS

In the year 1893, as geographer J. Cvijić started lecturing in geography and ethnology² at "Great School" in Belgrade, a predecessor of University of Belgrade, there were running preparations for a Prague event that is con-

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- 1 Our article is based on the study of specialized literature, the information from the estate after Drahomíra Stránská, as well as personal memories of her colleagues.
 - 2 In fact, J. Cvijić did not gave lectures in ethnology. For more information see the study "Jovan Cvijić and the first decades of creation and institutionalization of ethnology as a scientific discipline in Serbia" (Prelić, 2014).

sidered to be the beginning of scientific ethnology in the Czech lands. This was the Národopisná výstava československá [*The Czech-Slavic Ethnological Exhibition*] (1895) that became a great cultural and social event of its time and impacted the politics as well. It introduced the life of rural inhabitants that was understood as a bearer of the allegiance to Czech customs and traditions (Brouček, 2007). The preparations of the exhibition were accompanied by the so-called ethnological movement that included emancipation and political efforts of the Czechs in the Austrian-Hungarian Empire.³ Within the preparations of the Czech-Slavic Ethnological Exhibition, hundreds of local and regional exhibitions took place and there were founded centres for ethnological work with museum collections, clubs, magazines etc.⁴

At the beginning of the 20th century, the first contemplations about rapprochement between Slavic geographers occurred in Prague. It was J. Cvijić, who as the first one came up with the proposal in 1921 to organize a common congress of Slavic geographers and ethnographers. At the end of September 1922, he came to Prague to take part in the conference of Prague geographers and ethnographers at the Charles University Geographical Institute and he proposed Prague to be the congress venue. Prague geographers and ethnographers, however, suggested Belgrade as the first congress venue, yet they accepted the Cvijić's proposal "so honorary for us" (Švambera, 1926, 439). The congress was to point out what had been done in the field of Slavic geography as a unit as well as in particular disciplines. At the opening meeting, J. Cvijić took the floor on behalf of all scientific associations of the Kingdom of Serbs, Croats and Slovenes. He also was elected the honorary chairman of the Congress and he expressed his pleasure that the Congress took place under the auspices of President Tomáš Garrigue Masaryk. The voluminous Congress proceedings published all the papers, it mentioned all the sections in which the negotiations were running, it included names of the Presidium members,

3 Matija Murko made remarks about the Czech-Slavic Ethnological Exhibition in his essay *Národopisna razstava češkoslovenska v Pragi I. 1895* (Letopis Matice slovenske 1896, in German In: *Mitteilungen der Anthropologischen Gessellschaft in Wien* 25), in which he thinks about the organization of the cultural life in Slovenia (Brouček & Jeřábek, 2007, 152).

4 In one of them, Olomouc, a journal invitation to collect ethnographic materials was published in 1887 (Horák, 1933, 396); in 1892, there was printed a so-called *Tazatel* / *Questioner* that we can consider to be the first ethnographic questionnaire in the Czech environment (Tazatel, 1892). It included 700 questions concerning traditional tangible and intangible culture. In 1896, Cvijić's excellent instructions for ethnographic field study was published (Cvijić, 1896).

list of all participants as well as other information about Congress meetings, social events, map exhibition, excursions held after the Congress etc. (Švampera, 1926). During the Congress, the Slavic participants were invited by President T. G. Masaryk to a reception where J. Cvijić personally met the President and address him officially. After that, a banquet took place in the Spanish Hall at the Prague Castle. The Slavic participants also were invited to Prague Old Town Hall.⁵

Among the participants of the Congress, we can find – besides geographers – also leading researchers who devoted themselves to study of traditional culture in particular Slavic countries as well as to inter-ethnic issues. Besides J. Cvijić, it was for example South-Slavic geographers and ethnographers Borivoje Ž. Milojević (delegate of the Geographical Society in Belgrade), Artur Gavazzi (delegate of University in Ljubljana), Milovan Gavazzi (Zagreb), Borivoje Drobňaković (Belgrade), Matija Murko (Charles University in Prague) and others who took part in the Congress. Some of them were members of the Congress committee. Czech ethnology was represented by Karel Chotek, the first professor of ethnology, who worked at Komenský University in Bratislava at that time, professor Jiří Polívka, a Slavist, and professor Jan Jakubec, a literary historian; cultural geographers were represented by university professor Jiří Král, connected through his researches with Slovakia and Carpathian Ruthenia, or professor Antonín Boháč, a demographer and statistician, from whose works his *Národnostní mapa Republiky československé [The Ethnic Map of the Czechoslovak Republic]* from 1926 stands out, as well as professor Jiří Viktor Daneš, a geographer, explorer and diplomat and author of an essay about J. Cvijić, which was issued on the occasion of Cvijić's 60th birthday (Daneš, 1925). Professor Jindřich Matiegka, a physical anthropologist, was another significant Czech participant who – through his book *Plemeno a národ [Race and Nation]* (Matiegka, 1919) – became involved in the period discussion about the nationality. One can suppose by right that all the above researchers were influenced by J. Cvijić's methods and work.

Viktor Dvorský (1882–1960), one of the founders of Czech anthropogeography, is another personality who cannot be omitted and is not mentioned among the Congress participants. He devoted himself also to social, settlement and economic geography and he took an active part in the Peace conference in Paris, 1920, and other negotiations concerning the borders of the newly formed Czechoslovakia. He acted as professor

5 Our surmise that T. G. Masaryk was in personal written contact with J. Cvijić was not supported by a direct evidence after the research in Masaryk's correspondence (Hladký et al., 2005).

of geography at Charles University and a corresponding member of the Serbian Geographic Community in Belgrade (Chodějovský, 2010).⁶

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Professor Lubor Niederle (1865–1944) is one of the most important personalities of Czech and Slavic archaeology, history and ethnology. As known, he was author of many syntheses and he initiated the idea to found a big Slavic museum; together with K. Chotek he worked on the project of unimplemented Slavic Ethnological Exhibition (1912). The method of anthropogeography is reflected in his Ethnological Map of Hungarian Slovaks (1903 and 1906) in the accompanying text of which he determines the objective criteria needful to define the nationality.

Professor K. Chotek, L. Niederle's and J. Matiegka's student, accentuated the influence of environment on the development of the human and the culture. He understood field researches as the primary source of knowledge, as he showed in the exemplary monograph of the Slovakian-Hungarian village of Cerovo (1906). He considered the monographic research of a single location, the study of all phenomena in all connections, even from the point of view of a geographer, to be the most valuable method (Pražák, 1967, p. 22). *“Jědine v terěnu dostanu správný výklad. Duch kraje osvětlí problém...—Only in the field I get the correct explanation. The spirit of the countryside clarifies the problem...”* (Chotek according to Moravcová, 2006, p. 108). This conception is reflected in the works from his study journeys – *Češi na Kavkaze* [The Czechs in Caucasus] (1910), *Vývoj ruské kolonizace na severním Kavkaze* [The Evolution of Russian Colonisation in Northern Caucasus] (1910), *Abcházie a Abcházci* [Abkhazia and Abkhazian People] (1915). With his essay about culture he opposed the racism. He stated in that essay that the picture of the Czech lands inhabitants became motley after the annexation of Slovakian and sub-Carpathian regions. *“Přibyly nejenom nové složky etnické, ale jak jsem přesvědčen, i nové zajímavé problémy antropologické. Dále byl zpestřen tento obraz podstatně jiným vývojem kulturně-historickým a v souvislosti s podstatně odlišnou strukturou tohoto východního teritoria ve smyslu antropogeografickém, než jakou mají země české, i jiným vývojem lidové kultury a sociálních jevů ve smyslu etnologickém – Not only there came new ethnic groups but – as I am sure – also new interesting anthropological problems. Furthermore, the image became motley through a*

6 J. Erdeljanović (1910) classified his book *The Montenegro and Turkish Border from the Mouth of Bojana to Tara* (Prague 1909) in *Czech-Slavic Ethnographic Journal* as a valuable anthropogeographical study.

different cultural and historical development and – in connection with a significantly different structure of this eastern territory in the anthropogeographical sense – than the Czech lands have, as well as through a different development of folk culture and social phenomena in the ethnological sense.” (Chotek, 1934, 129). K. Chotek was an excellent teacher, he educated a new generation of ethnologists and he was an organizer of science as well. As early as in 1907, he was elected member of the governing board of The Czech-Slavic Ethnological Society, whose chairman Prof. J. Matiegka was and J. Cvijić was one of its members (Pražák, 1967).

Drahomíra Stránská (1899–1964), future leading Czech inter-war and post-war ethnologist and museum worker, continued his work. She took part in the Congress as a fresh graduate from Charles University. Her name is not mentioned within the list of Congress participants, so there is no choice but to search in her personal fund stored at the Department of Ethnography of the National Museum in Prague (Štěpánová, 1999).

If we want to look for a direct effect of J. Cvijić's school and the relating cultural and geographical direction of the research on the inter-war Czech and Slovak ethnology, we have to mention the work by the above D. Stránská. Under the influence of a seminar led by prof. Jan Jakubec, the graduate from Slavic and Romanian studies at Charles University (1924) concentrated herself on the research of tangible culture of the Czech and the Slovak ethnic group, as proven by her dissertation, presented in the form of a monograph, wrote about the Western-Slovakian village of Dolná Poruba (Štěpánová, 1999). In 1925, D. Stránská could leave for a semester study stay at University of Belgrade where she could acquaint herself with museum collections in Ljubljana, Maribor, Zagreb and Sarajevo and make several field journeys (Šumadija, Banat, Skopje and Dubrovnik). Even though specialized journals reported about her study at prof. J. Cvijić's department (Johnová 1965, 55), the source material from her estate does not confirm the aforementioned fact and – moreover – J. Cvijić – after having received the honorary doctorate degree – gave lectures at Sorbonne University in Paris in winter 1924–1925 (Daneš, 1925, 15). Drahomíra Stránská's personal fund mentions the names of his students, Professors Jovan Erdeljanović and Borivoje Ž. Milojević, with whom she conducted the correspondence later (Štěpánová, 1999, 8). In any case, D. Stránská familiarized herself thoroughly with J. Cvijić's work during her stay in Belgrade and she applied the principles of cultural and geographical direction (anthropogeography) in Cvijić's interpretation to the domestic Czech and Slovak material in her work.⁷

7 As to Cvijić, anthropogeography is based on a permanent research of all component

D. Stránská is author of the *Příručka lidopisného pracovníka* [*Handbook of an Ethnographic Worker*] (1936), in which she published a thorough instructions how to implement field researches and how to collect ethnographic materials; in certain respects, a direct inspiration by anthropogeography is visible. Among other methods of collector's work, she also mentions the cartographic method and she recommends to apply the functional and psychological point of view (Stránská, 1936, 17). “Každý probíraný zjev a předmět je výsledkem života v kraji. Ať už byl domácím lidem vytvořen nebo prostě jen přijat, vždy musil vyhovovat jeho potřebám a proto musil být i výrazem jeho názorů; zároveň s nimi se musil měnit nebo zanikat – Every discussed phenomenon and object is a result of the life in a region, should it be created or just accepted by the local people, it always had to correspond to their needs and therefore it had to express their opinions; at the same time, however, it had to change or cease to exist” (Stránská, 1936, 17–18). She emphasizes the respect for the natural character of a region, its morphology, climate and geological circumstances (Stránská, 1936, 27–28).

D. Stránská ranked among the major promoters of the idea to compile an ethnographic atlas; she also took many particular steps to implement this idea. With her article *O soupis a atlas lidových staveb* [*For the List and Atlas of Folk Buildings*] (Stránská, 1934–1935), she informed the Czech expert public about the listing and documentary works that were to precede the ethnological atlas. As obvious from the title, she chose the folk house from the wide theme of folk culture. She assessed the researcher's interest in the above theme since the Czech-Slavic Ethnological Exhibition (1895) and she considered a thorough list of all significant documents of folk architecture to be a necessary precondition for next analytic works. The afore-mentioned list would have enabled to elaborate and publish an atlas work: “Taková díla mohou být ovšem zpracována jenom na podkladě spolehlivého vyčerpávajícího materiálu, mají-li odpovídat skutečnosti a požadavkům vědy – Such works, however, can be elaborated solely based on a reliable and exhaustive material if they shall correspond to the fact and scientific demands” (Stránská, 1934–1935, 92). With these words, she understood a high-quality heuristic work in archives, study of technical literature, and pieces of knowledge got by field researches. She believed the basic contribution of ethnological atlas and cartographic method to insist in discovering the way of culture streams that formed the Czech and the Slovak folk culture located at the crossroads of the East and West influences. She concretized

of life, seats and communities of people, and it covers the branches that are usually considered a subject-matter of the ethnographic and sociologic research (Daneš, 1925, 20).

her ideas in thematic circuits that could be cartographically treated in the branch of folk architecture: type of yard, building material, tectonics of the house, roof structure, house layout, fireplace and its location (Stránská 1934–1935).

Because of the political situation in Europe at the end of the 1930s as well as war events, she came back to the theme of the ethnological atlas only after 1945 under new social conditions when ethnography was expected to be a strictly historic science. Atlas works became a primary task for Czechoslovak ethnographers. Despite the isolation, in which the branch found itself after the Iron Curtain had been lowered, D. Stránská brought the basic information about ethnographic atlases in different European countries in her essay *Historicko-národopisný atlas Československa [Historic and Ethnological Atlas of Czechoslovakia]* (Stránská, 1956), in which she tried to apply the obtained pieces of knowledge on domestic relations. She thoroughly thought about some problems accompanying the implementations of ethnological atlases – if one shall advance in stages or follow all the principles of folk culture as a unit, how to define the period of time from which the information shall be collected, or the choice of questions and methodology of data collecting. In conclusion, D. Stránská states that: “*národopisný atlas bude velkým dílem, které je potřebné pro studium etnografie naší i jiných národů – the ethnological atlas will be a great work that is necessary for the study of our and other nations’ ethnology*” (Stránská, 1956, 321). However, her vision did not come true. Her early death prevented her from finishing the atlas work even though she succeeded in collecting a large ethnographic material from the Czech lands through her network of correspondents. Moreover, the atlas work was no more a priority for committed socialistic ethnology after the year 1968 – in contrast to Slovakia where colleagues – ethnologists and folklorists – issued a complex *Ethnological Atlas of Slovakia* (1990) after large field researchers executed in the 1970s.

The Ethnological Atlas of Bohemia, Moravia and Silesia, step-by-step issued by the Institute of Ethology of the Academy of Science of the Czech Republic in the form of partial instalments, is missing the completeness; it is compiled based on statistical documents resulting from the activity of state and church bodies (ploughing tools, folk production, pilgrimage, ethnographic and ethic image of the Czech lands). According to the coordinators of the work, it is not possible to create a traditionally designed ethnological atlas of the traditional folk culture phenomena (Woitsch, 2012).⁸

8 Unlike the ethnological atlas, Czech ethnologists implemented a planned encyclopa-

We are coming back again to Drahomíra Stránská's ethnological work. She used the principles of cultural and geographical direction in her works continuously, even if the work belonged to the area of folk dress and textile or furniture – these themes alongside the folk house were the crucial ones in her work. Her knowledge about Slovakian and South-Slavic material allowed her to realize large pioneering exhibitions at the National Museum in Prague: *Tatry – kraj i lid* [*Tatra Mountains – the Region and the People*] (1933) about less known folk culture below the Slovakian Tatra Mountains, *Durmitor* (1935) discovering the shepherd's culture in Montenegro or, in 1938, the exhibition *Bulharsko – země a lid* [*Bulgaria – the Country and the People*] connected with the presentation of new material acquired by her own field research including a large log house translocated from Nesebar.

She published the results of her research work in journal studies as well as independent publications, she used them for her pedagogical work at Charles University where she gave lectures from 1951 and – thanks to her good knowledge of Slavic languages – she presented them at international forums whereby the afore-mentioned congresses of Slavic geographers and ethnographers (Poland 1927) or philologists (Prague 1929) were ones such. The third congress of Slavic geographers and ethnographers took place in 1930 in Yugoslavia (Belgrade) and D. Stránská read the paper *Studium lidových obyčejů. Úkoly a metody* [*Study of Folk Customs. Tasks and Methods*] there. The paper was elaborated based on a wide comparative attitude and her habilitation thesis defended at Charles University in 1932. The fourth congress took place in Sofia (1936) and Stránská devoted herself here to the issue of the folk house in relation to the majority and minority ethnic groups (Štěpánová, 1999).

The researcher's versatility, her museum, editorial and pedagogical work alongside the published works allow to speak about Senior Lecturer Drahomíra Stránská as about a personality of European ethnology (Mevaldová & Tauberová, 2011).

In addition to Drahomíra Stránská's work, the methods of the cultural and geographical (anthropogeographical) school in inter-war Czechoslovakia were refined by Czech domestic geographers, such as Jiří Král on the basis of his field researches in the Carpathians, i.e. in Slovakia and Carpathian Ruthenia, or Antonín Boháč with his work devoted to ethnic composition in former Czechoslovakia and minorities of Czech compatriots abroad. J. Král issued an overview of anthropogeographical literature focused on Slovakia and Carpathian Ruthenia, published in 1919–1934,

dia of folk culture as early as in the 1930s. it was published with three volumes at the outset of the 21st century (Brouček & Jeřábek [Eds.], 2007).

from which the period inter-disciplinary cooperation of Czech, Slovak and Polish ethnographers and geographers is clearly obvious (Král, 1935).

CONCLUSION

Jovan Cvijić's work was presented to the Czech public thanks to anthology *Balkánské otázky. Kulturní a politicko-žemepisné stati [Issues of the Balkans. Cultural and Political and Geographical Essays]* with characteristic features of particular cultural zones and division of nations in the Balkans (Cvijić, 1924). The anthology is not only a witness to the method of Cvijić's scientific work and high acribia but also to the objectivity with which he understood e.g. the sensitive Macedonian Question. The work devoted to the sixty birthday of J. Cvijić (Daneš, 1925) thoroughly characterizes the personal profile of J. Cvijić, his scientific and academic career, work abroad and major results of his activities. The work also includes a map with marked Cvijić's excursions – research journeys in the Balkans between 1888 and 1925 (Daneš, 1925). The Czech-written titles prove his scientific importance in the Czech lands: personal entry Jovan Cvijić (Daneš, 1909) in Otto's Encyclopaedia (1888–1909),⁹ Jovan Cvijić – monograph by J. V. Daneš (1925), entry in Masaryk's Encyclopaedia (1925) as well as completed personal entry in Modern Otto's Encyclopaedia (1931), including the entry of R. Jeřábek in Biographic Encyclopaedia of European Ethnology (Jeřábek, 2013) and involvement of his work into the context of the contemporary Balkan studies (Luković, 2014).

It can be stated that Jovan Cvijić's work was extraordinary inspirational for Czech ethnology and geography and it supplies proof of close scientific and personal contacts between both countries. The honorary doctorate degree Charles University conferred on J. Cvijić is an undoubted evidence thereof as well as the words of J. V. Daneš: "*Cvijićova vědecká práce proměnila dokonale naše známosti o Balkánském poloostrově v mnohých směrech. Jeho zásluhou stal se tento velký geografický celek – před počátkem jeho působení téměř "terra incognita" – po mnohé stránce jednou z nejspolehlivěji probádaných oblastí na povrchu zemském – Cvijić's scientific work intimately changed our knowledge about the Balkan Peninsula in many respects. Thanks to him this large geographical unit – nearly a "terra incognita" before the commencement of his work – became one of the most reliably researched areas on the Earth's surface*" (Daneš, 1925, 28).

⁹ Otto's Encyclopaedia was the most respected encyclopaedia in the following century in the Czech lands and it was one of the best encyclopaedias in the world. His entry *Kras/ Karst* was entered into the Otto's Encyclopaedia (Cvijić, 1900).

ACKNOWLEDGEMENTS: This paper was written with the support for the long-term conceptual development of a research organization – RVO: 68378076 (J. Pospíšilová) and the Masaryk University special research “Folk Traditions as a Part of Cultural Heritage” - MUNI/A/1282/2014 (M. Válka).

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HOUSE TYPOLOGY BY JOVAN CVIJIĆ AND ITS ETHNOLOGICAL IMPORTANCE

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ABSTRACT: Jovan Cvijić, scientist and researcher, left invaluable legacy in several scientific areas. He called himself a geographer and geomorphologist, but he had also contributed to the development of numerous social sciences. The role of Cvijić anthropogeographical school in the first decades of development of ethnology in Serbia was huge. In his book "La Péninsule Balkanique: Géographie Humaine," Cvijić analyzed anthropogeographic and ethnographic phenomena including development of the material culture. Among other things, Cvijić collected empirical materials about house types, studied history of houses in great detail, analyzed houses, and then classified them. Thus, he significantly contributed to the study of old national architecture. He was the first Serbian scientist in the field of geography who pursued the specific process of studying a house as the village basic cell. According to Cvijić, each house had to be in compliance with the appearance of the landscape in which it was located. Many of these house types from the late 19th century until now have vanished or have been only individually conserved and Cvijić preserved their names from oblivion. He described temporary and primitive forms of houses, briefly commented on the new type of house in the Balkan Peninsula, and in the analysis he included other buildings on the plot, as well. Cvijić established the link between house types and the occupation and needs of household members. Today, neither of these forms of houses are built. However, some of these houses are preserved and today they are museums with cultural, ethnological and tourist importance.

Key words: Jovan Cvijić, house types, the Balkan Peninsula

INTRODUCTION

Jovan Cvijić, world scientist and great explorer of nature and society, was born on October 12, 1865 in Loznica, where he finished elementary school

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and the first two grades of high school. The third and fourth year of high school he attended in Šabac and the fifth in Belgrade, where in 1884 started comparative studies of geography and ethnography at the Natural Sciences department of the Faculty of Philosophy of the Great School (Stanković, 2015). Still a student, he published his first scientific paper "Contribution to our geographical terminology", and after he graduated at the Great School in 1888, he worked as professor in the Second Belgrade Grammar School. A year later he obtained a scholarship at the University of Vienna, where in 1892 he defended his PhD thesis in geography and geology "Das Karstphänomen" which was published in 1893 in the journal *Geographische Abhandlungen* and later extended in the Serbian edition entitled "Karst". In the same year he has been elected for professor of geography at the Great school in Belgrade where he founded the Institute of Geography, today's the Faculty of Geography of the University of Belgrade (Grčić, 2004). In 1895 he was elected for corresponding member of the Serbian Royal Academy (today SASA¹) and four years later for a regular member, and from 1921 until his death he was its president. Thanks to Cvijić in 1905 the Great School in Belgrade was transformed into the University and Cvijić himself was rector in 1907/8 and in 1919/20 (Stanković, 2004a). He was founder and the first president of Serbian Geographical Society (Stanković, 2012). As an intellectual a professor and expert in determining ethnographic boundaries he was present at the Peace Conference in Versailles, but he has never been directly politically engaged. As a famous scientific worker Cvijić also was a visiting professor at the University of Sorbonne in Paris, where he lectured "About ethnography of the Balkan countries." He died on January 16, 1927 in Belgrade, leaving behind an invaluable work in several scientific areas (Vasović, 1995).

With his work, that include more than 10,000 pages, Jovan Cvijić has secured a place among the immortals of Serbia, Balkans, Europe and the world. He was the first modernly educated Serbian geographer and most of his work was devoted to his homeland and the Balkans. He always called himself geographer and geomorphologist but he also contributed to the development of many social sciences. He pointed out that geography is the only science that connects mutual relations and causality of nature and society. The science which study populated countries, the population, economy, transport, settlements, people and culture in general can't be strictly separated from the rest of sciences (Stanković, 2006).

1 Serbian Academy of Sciences and Arts

CVIJIĆ'S ANTHROPOGEOGRAPHICAL SCHOOL AND DEVELOPMENT OF ETHNOLOGY IN SERBIA

Literature about scientific papers of Jovan Cvijić is very extensive both in Serbian and foreign languages. His works can be divided into several groups, among which are the works in field of anthropogeography and ethnology of the Balkan Peninsula in which he used new unique scientific methods and many of those methods are still applicable. This Cvijić's acts constitute the basis of anthropogeography of Balkan countries (Gledić, 2008).

In anthropogeographic researchs, Cvijić, together with his students, co-workers, teachers and priests have been collecting empirical data on the impacts of the geographic environment, migrations, origin of the population, rural and urban settlements, house types, tribes, families and collective farms, psychology types, national costumes and home furnishings. He was the first scientist who during his travels came to a result by immediately questioning people. This is evident in the first Cvijić's anthropogeographical work the "Guidelines for the study of villages in Serbia". This work consists of seven basic parts² having six to eight questions and a few additions, which is more than a hundred³. So detailed terrain research has enabled complex review of anthropogeographic phenomena, processes and problems. From the time of Jovan Cvijić until today regardless of the development of geography and related sciences, it hasn't been such precisely defined and detailed surveys and analytical interviews between researchers and local people. Such an approach to the study is named Cvijić's anthropogeographical school (Stanković, 2013).

2 Basic parts: 1. Village location; 2. Village type; 3. House, yard and plot; 4. Pojate or stanarica (flats, farms); 5. Stories and interpretations of the names of villages, hamlets and their regions; 6. The origin of the population, the origin of villages, homesteads 7. Occupations (Cvijić, 1902).

3 Eg. within the part 3. House, yard and plot, the questions are: 1. Is the yard fenced (and with what) or not? On which side of the yard is the gate? 2. Is in the yard only one house or is there a guest house or shelter or baškaluk (čardak)? Is house in the middle of the yard or beside? Of which are built farmhouse (chalets, plaiting or šeper, of adobe, of charge, of brick)? What are called certain parts of the house and what is their purpose? How roofs look like: high or low? Are one or two doors on the house? What kind of chimneys and dormers have houses? Are there windows? How windows look like and of which are made? Of which is made floor? Are there houses, where live under the same roof, both man and animals? 3. What kind of buildings are around the house and what is their purpose? Apart from these buildings is there anything else in the yard (baking kiln, farm, backrest, cochin, pigsty etc)? 4. Is there a plot around the house, and of what it consists of? 5. Are plevnje (or baskets) used only for storing straw and cornstalks or does animals live in them? Etc. (Cvijić, 1902).

The role of of Cvijić's anthropogeographical school and his 38 years long anthropological and ethnological research of the Balkan Peninsula, in the first decades of development of ethnology in Serbia was huge. Cvijić's first contact with ethnology was even when he started comparative study of geography and ethnography at the Great school in Belgrade and later he became an organizer and promoter of ethnology as a science in Serbia. He was aware of the fact that for antropogeographic work is necessary knowledge in ethnology so he organized the "particular course in ethnology" within the Geographical seminar, held in the Geography Institute. In this he was assisted by one of his best students Jovan Erdeljanović, who first called Cvijić the founder of "science of people". A large number of topics that interested Cvijić belonged to the classical ethnology (cultural belts, migration, material culture, the appearance of the village, clothing, economy, psychological types) (Prelić, 2014). He emphasized the importance of natural science methods in study of people, but in the research applied also social sciences methods. A significant method was method of typology which practiced in research of ethno-cultural identity of the Balkan nations (Grčić, 2004). During his journeys he visited museums and the national assemblies, was interested in the feasts, customs, old Balkan animal husbandry, cottage industry, manufacturing, crafts and material life of the Balkan nations.

HOUSE AS A BASE OF NATIONAL ARCHITECTURE – DEFINITION AND TYPOLOGY

Cvijić's contribution to the study of the old popular architecture of the Balkan Peninsula, especially house types and economic buildings is huge. In his work "La Péninsule Balkanique: Géographie Humaine"⁴, Cvijić elaborated main anthropogeographic and ethnographic phenomena including the creation of material culture (houses, rural buildings and household items). In Serbian geography it was the first time that house as the basic cell of every village was examined in detail.

To explain closer the concept of house, Cvijić (1902) gives a definition of yard and plot: "By yard is considered the house and all buildings that are around it, and are enclosed by a common fence ... or if there is

4 The work "La Péninsule Balkanique: Géographie Humaine", published in Paris in 1918 containing published anthropogeographic and ethnographic lectures that Cvijić lectured at the Sorbonne. The work "Balkansko poluostrvo i južnoslovenske zemlje" represents amended and expanded translation of "La Péninsule Balkanique: Géographie Humaine" and was published in Belgrade in 1922 (Stanković, 2004b).

no fence, belonging to a family (or cooperative)... House plot makes forts or garden, orchard and forest (branjevina, zabel, gaj)" (p. 14). He points out that national concept of house, for most of the southern Slavs of the Balkan Peninsula, includes the room where the fireplace is (where the fire burns, the fire) and in which can be entered directly or from outside, or from the porch. Each house had to be in compliance with the appearance of landscape in which is located or how Cvijić (1922) would tell types of houses are "in harmony with the composition, appearance and landscapes vegetation" (p. 191).

He says: "Traveller who have been kept in the mountains for a long time where leave no traces of human work and life, feels joy when, descending into the valley finds houses, scattered or gathered. At that moment he clearly know how the house contribute to the appearance of the landscape" (Cvijić, 1922, 191).

Cvijić (1902) states that landscapes were changing over time and thus changed the look of each house. The house reflects the culture of man and how man was changing and progressing adopting thing seen during trips, striving for progress, man changes the shape and material of the house, the arrangement of its internal parts and crafts. Come to that the house, throughout history, have been changing, and with it have changed buildings and vegetation around the house and landscape. The fact that the Balkan Peninsula has great diversity in site, location and construction of types of houses, Jovan Cvijić explains with the following causes: materials used in the construction of houses of different areas, occupations, influenced civilization and ethnic preferences of the people. As those reasons changed over time, for Cvijić was significantly to accompany evolution of certain house types⁵ (Cvijić, 1922).

All nations of the Balkan Peninsula had a one-piece initial house, ie. house consisted of only one room⁶ where a fire was burning. With historical studies Cvijić determined chronological occurrence of supplements to the original house, and concluded: "From the beginning additions are used only for storage and they are called pantry, larder, suldrma, huger. Later served for sleeping over and were named rooms or chambers. In all of the following additions, as well as in vajat fire didn't burn". The definition

5 Due to deforestation wood timber vanished, ranchers became farmers, civilizations came one over the other, and because of metastasized movement human groups of various ethnic predisposition settled far from their homeland, bringing their habits.

6 Cvijić says that one-piece houses are not specific to the southern Slavs, but also for other nations and poor farmers of his time that still have a one-piece houses because they are minimum space required for life (Cvijić, 1922).

of home in a wider sense, except the room where the fire burns, includes the whole building, with all accessories, and more generally the house means a main building with accessories and all barns and buildings around it. These additional specific building of certain areas are anthropogeographically very important. It was common to any old house to serve as a building or barn, when new house replaces it (Cvijić, 1922).

The main objective of Cvijić's anthropogeographic research of houses was to determine the differences between main house types on the Balkan Peninsula. In the continuation of this paper Cvijić's house typology is presented.

Primitive and temporary forms of house

Sibara is the most primitive conical shape of the house with a burning fire in the middle of one round room. It had no windows, attic and floor, but only a low door and a hole in the middle of the roof through which the smoke came out. That were houses that represented shelters, pastoral houses and houses of poor people, and most of them could be seen in the mountain areas. *Sibaras* were built in Stari Vlah, around Mučanj and Golija where they were called *kulače*, and in Šumadija with *Levač* and in Morava called them *šilje*, *šiljače*, *krivače* and *krivulje*. *Busara* is similar to *sibara* and the difference is that they were covered with pieces of land with grass. They could be seen in the upper Ibar, above *Rožaje*. *Lubara* was in prismatic shape, without foundation, covered with *lub* of linden tree. These primitive pastoral huts were presented in southwestern Serbia, and in Kragujevac's *Lepenica* they were called *korke*. *Dubirog* or *savardak* was the pastoral building, in form and structure very similar to *sibara*. They could be seen in the Montenegrin hills, in *Polimlje* and *Sjenica* region. *Slamare* were also known as *potleušice*, *klješare* and *fidžurice*. These one-piece houses with no attic covered with straw or *lub*, attached with stones were widespread around the *Morava*, upper *Vardar* and on the *Adriatic coast*. *Mobile chalets* could be transported, they were without foundation, and as a base on all four corners of the house were placed large rocks, and on it four beams (*temeljnjače*), on them were laid another beams to make cloth or *duvar* linked with incisions or *ravines*. Their attic and roof were made of boards or shingles. *Chalet* could be unfolded, and roof was completely transmitted by ox cars. They could be seen in western Serbia and *Mačva*, and they are related to the time when the population often and hastily moved. *Pit houses* were made in *loess*, *travertine* and *hardened gravel*. *Pit houses* in *loess* were most represented in *Srem* and *Bulgaria*, and it is believed that *Zemun* was named by them. *Burdelji* were variety of *pit houses*, such as artificial

caves carved in loess in which during the Ottoman era lived people. Mostly were consisted of one room, rarely two rooms, and in their floor were cereal holes for hiding food. They could be seen in the region of Bela Palanka and Pirot (Cvijić, 1922).

Chalets in forested dinar area

Mostly were built in krčevina or trebež or žar and were the main type of houses in the mountain areas of Serbia, western dinar countries and in wooded karst areas. Chalets were permanent houses, consisted of one room in which was a burning fire. The simplest kind was a chalet without a foundation and more complex chalet had foundation built of stone. In the logs were made one or more small holes (shafts) which closed with board or kaik representing primitive windows. There was no attic, and above the fireplace was les or čeren for drying corn. Between the beams of attic were placed woodlogs for drying bacon and trout. Roof of boards or shingles was steep and high in mountain regions and lower and milder incline in the Šumadija hills. Smoke from the house was coming out through the roof, windows and through badža of various forms. Later was developed wooden chimney kapić covered with wooden cap. There were two doors facing each other. Characteristic cooking utensils are kettles and crepulje used for baking bread, and other kitchenware were made of pottery or wood. Around chalets were economy buildings or barns. They were, together with house, fenced with iloš or leška or with hedges, rarely with vrljika. The fenced area was called the courtyard. There were two gates through which it was entered into the courtyard: small for people and big gate for wagons and cattle. Porch or veranda were rare part of chalets. Starting from this basic form, chalets were developing in horizontal and vertical directions (Cvijić, 1922).

Stone house on the Adriatic coast and bare karst

Houses of stone, terrestrial or two floors, very rarely on three floors high were presented in the Adriatic coast and the bare karst. These were the most durable, almost "eternal" houses⁷. Stone fixed houses so pillars and permanent decorations could be built and perserved on them to keep up the level of historical and cultural development. Stone houses of the Adriatic coast were packed together in tight streets. Courtyards were very small with stables for animals. Since these areas faced shortages with water, Cvi-

7 Influenced by humidity, rain and snow most porous and less durable houses were houses of adobe and wattle. Longer than they persisted chalets and the longest duration had stone houses.

jić noted that the yard and approaches to these houses were often dirty. Inside, instead of stove these houses had a fireplace. There were many types of stone house, but it could be distinguished two elementary types of stone house. The first is a singlestone house (one-piece) without internal walls that matched with dinar chalet with one room (different in that it was made of stone covered with rye straw, rarely board, often plate, and later with ceramic tiles). The floor was turf or soil, rarely of stone plates, it had chimney, the roof badže or videlice and one or two doors.

Of this most primitive form were developed two-part and three-part stone houses, a double and triple ground house created of the long stone house rebuilt by low walls into two or three houses. On the Adriatic coast were often houses on two floors. Both floors were built of hewn stone, covered by the panel or with ceramic tiles. They had chimneys. Windows were made of glass and were closed with shutters. In the area of the Vasojević tribe was comprised the combination of stone and wooden house (Cvijić, 1922).

House of adobe and wattle in the area of Morava-Vardar

This type includes several types of house. In common for all those house types is the fact that they were built mainly of wattle, chatham and adobe.

Moravian house - the intersection was square, rarely rectangular, squat, built of adobe or wattle and covered with hollow tiles or roofing (earlier with boards). Had a characteristic knitted chimney, which was wider in the upper part. It consisted of three parts: ajat, house and room. Ajat was rare in chalets and often present in the Moravian home. It represented the hallway in front of the front part of the house where door was. Ajat's floor was of beaten earth, surrounded by planks or laths, with wooden pillars that supported the roof. Around Moravian house was no vajat. The entrance to a guest room or odžaklija was directly from ajat. Mostly it was represented in the villages of compact type, while the chalets were related to the villages of scattered type. Therefore, the courtyard of the Moravian house was little. Area of distribution of the Moravian house was large and had several varieties.

Skopje variety - characteristic for this variety were little huts which had been also seen in Poreč. It was a temporary building, built by girls in rotting manure (which kept the heat in winter) after the holiday of Mitrovdan and lasted until the holiday of Djurdjevdan. Those little huts were special barns where girls embroidered and sewed during the winter.

Čitluk house - this house, unpainted, often covered with rye straw and roofing, with no chimney and no windows make the transition between

the Moravian and čifčijska house. They were not equal, and among them were several types.

Vardar house of weak material was more similar to čitluk houses. Often these houses had two departments, one was pond on the entrance. Animals were kept there, and the other part was "house" where the fire was burning.

Pojata in Eastern Serbia was cattle building which was closely related to the Moravian house of Eastern Serbia. In this region families were spent almost half of the year in pojata and there were some villages where the peasants lived in pojata coming to village only for the holidays or at the invitation of the authorities (Cvijić, 1922).

Upper Vardar two-storey house also had varieties. Around the house there was often a stone wall, which looked like the wall of the fortress. In spacious courtyard were unpainted house, a barn and a basket. Almost always the house was a two-storey, covered with hollow tiles and the lower floor with a kitchen and a fireplace was without the floor. Barriers made of boards were separated departments for livestock, which was closed in the house to be preserved from theft. The upper floor consisted of rooms. The number of rooms was the same as the number of family members. All the valuables were kept in chests or coffins.

This type of house is similar to the residential quartets of Orthodox monasteries. Quite rarely existed garden around the house, it was only a few buildings because they tried to accommodate everything in the house. In some areas it could be found a barn (žitnik, koš) in which they held corn. Čardak was also characteristic for this house type built by the upper floor, along the whole front side of the house (Cvijić, 1922).

New types of house

Houses of this type were more spacious than older houses types, had often two or more rooms and these rooms were sought to replace vajats and guest houses of earlier types. When the progress and the wealth were more noticeable, these new types of houses were more represented. These houses always had brick foundation, sometimes they were still partly of wattle, especially of adobe, but were increasingly built of bricks and covered with hollow or tiles. They had famous chimneys which were like those on urban houses. Houses had one door and always were painted. Outside the house there was roofed porch or pritremak. The door was leading in the "house", which was increasingly called kitchen or kitchenette. They had a guest room (baškaluk). If the family was larger, with more married members, new houses had up to 4-5 rooms. Examples of these houses could be seen in

Valjevo, Tamnava, Kolubara and Mačva. All the rooms had a stove, mainly kaljevačka stove with pots. Kitchen utensils and furniture of new houses moved away from tableware and furniture of the old types. The influence of agrarian life could be clearly seen in the new types of house. There were several kinds of new house types different in each area. They are known Mačvan houses, outside decorated with colors and with beautiful chimneys. Along with them have developed new osaćanke, and other younger were šumadinka, tamnavka and bošinka. In the Sava and the Danube region could be seen erdeljke, houses of charge with multiple departments. New houses were built on the model of urban homes (Cvijić, 1922).

Other types of house

Čifčij houses from the liberation of the Ottomans under the influence of the new age quickly disappeared or have been transformed. Those were most often rows of huts built of plot (wattle) or above, unpainted, covered with straw, rarely with hollow tiles consisting of, as a rule, one small room, rarely two – the court and the chamber. These houses were poverty furnished.

Turkish-oriental houses and towers have been also quickly disappeared. Their courtyard were surrounded by a high wall with a high restricted arc. Their gates almost always were closed. Courtyard were cobbled or tiled. Houses of adobe or wattle, painted covered mostly with tiles had two floors. In the lower floor were barns and chillers, sometimes stables, while the upper floor consisted of a house with rooms and was called čardak. The towers were represented all over the Balkan Peninsula, always made of stone for various purposes, and differed in two types: tower as guard and fortifications and tower as apartment, which was at the same time house and protection. Towers were mostly surrounded by a plot of thorns or wire fence, rarely with a stone wall. The shape of intersection was square or rectangle. Towers had mainly two, rarely more floors. They had no windows, only loopholes (mazgale). The servants lived in downstairs rooms, while the upper floor rooms were for the master and his harem. Although they were used for living, the towers could stand the siege.

Greco-Aegean brick house was similar to a two-floor stone house of the Adriatic coast. It was built of different materials, often made of stone. The lower floor was mostly used as a storeroom or larder and the upper floor usually had a spacious entrance hall and rooms with many windows. They had no stoves or fireplace. The yard area was almost always cobbled and in one corner was placed a small garden. Around the house, very rarely, existed other building. Some were surrounded by a stone wall, and most were without fence. On the ground floor were kept horses and donkeys,

and the upper floor was a real house with rooms. The courtyard was mostly treeless (Cvijić, 1922).

Building or stalls

Buildings or stalls were objects around the house and in mountains which were more built in the areas of increasing prosperity and regions with developed agriculture and fruit production, in addition to animal husbandry. Some of them were built around the house of all the previously mentioned types, and there are those which were characteristic for certain areas. In the area of chalets typical buildings were: vajat, konak or guest houses, mlekar, čardak and sobrašice.

Vajat (ižine, klet, stasina) had previously been exclusively built of beams, had one room without an attic, covered with boards or shingles, and floor was made of rammed earth. In Vajat fire never burned. It was a sized of moderately room and was considered the property of individual members of family. Vajat had the functional of room and storage. *Konak* (šetinska house, odeojac, konačić, baškaluk) developed as a side building ever since chalets. Real dormitory or guest houses could be see in the area of Stari Vlah, Podrinje and Valjevo and in Šumadija. It was a special building for guests, chance travelers, for meeting of village hosts, celebrations, weddings, etc. It can be said that konak and vajat existed in the most developed areas of cooperative living. Rich cooperatives were considered that their host need to have the best building. The most beautiful kitchen utensils and furniture were left in the guest house. Previously host room was for the guest, when there were guests the host was slept in an old house or vajat, and later in konak was build a separate room for guests. *Mlekar* was made of wood or wattle raised on davits of land and was used for storing milk and milk products. Covered with boards or shingles represented the cleanest building. Many mlekar building were present in the areas of developed animal husbandry and during the life in the cooperative each house had at least one mlekar. *Čardak* (doksat, ajat) was a long building for corn in cob often constructed by the house next to the cage. In Bosnia, čardak was a room or an entire floor with rooms in Mohammedan homes. *Kovaonica* is a building for the repair of tools. *Sobrašica* and *čardačić* were buildings around churches and monasteries in western Serbia from the Morava to the Drina River. They were made from timber as small houses which always consisted of one room in the middle of which was a large table surrounded by benches. These were buildings of fairs and national celebrations. Every wealthy villager had his sobrašice at the church or monastery, where he was receiving guests during the fair. *Pušnica*

(dryer, mišana, ošafana) was characteristic building for areas where plum was cultivated: Posavina and Semberija in Bosnia and almost the entire Moravian Serbia, the area of Podrinje-Valjevo and Šumadija. It was built near the house and served for drying plums. *Pivnice* was building over the vineyard, especially Krajina and Kopaonik Župa, where the group pub was called poljana. *Gumno* was characteristic building in Southern Dalmatia, Dubrovnik area, Montenegro and other areas of the stone house. It had often been more expensive than the house, enclosed by a wall of beautiful hewn stone, paved with slabs, and in the middle of a small stone pillar. It was used for beating and threshing of wheat, and later became the place of ceremonies, meetings and games. *Klanica* is a building represented in Herzegovina and south-eastern parts of Bosnia in the chalet regions, as well as in the field of stone houses. In Drobunjaci was called pojata. It has always two floors, built of timber or masonry. In the lower floor were kept animals, and in the top floor fodder. *Pojata* (plevnja, plemelj, old hlevina) was building with the Morava-Vardar house and had a similar purpose as klanica. It was a building in the form of home prizemljuša, of wattled, adobe or stone, built with mud, covered with rye straw and often with tiles, without any barrier. In it was left the straw and hay for livestock over the winter. It was in the courtyard, and the wealthy villagers had one plevnju in the field away from the village. *Stan* or *cottage* was in fact a house and everything in it were placed as at home, only on a smaller scale. Shepherds were occasionally sleeping in the cottage. Around the cottage were šorovi (torine, kotari) where the sheep slept during summer. Summer shepherd's cottages were katuni of Dinaric areas, bačilišta and bačila of Morava-Vardar region and farms of Eastern Serbia. In some areas, as in Drobunjaci, there were winter dwellings for shepherds and cattle, and were called vašani. *Slon* (*triboj*) was a special form of tor high fenced with the top of the fence leaning towards the center of the fold. *Kučer* (kućar, kućara, tružina) was a small little building on a sledge. *Staja* represented the winter habitat of the shepherds (Cvijić, 1922).

By observing the house types Jovan Cvijić has closely followed the changes in appearance, structure and purpose of the house, compared the then and the former buildings and even then was aware that the then new house types in the future would be replaced by other more modern buildings, and numerous examples of individual house would become a rarity. That's what Cvijić himself (1922) stated: "For the last thirty years of traveling and observing houses in all regions carried out a huge change; It could be followed a step by step to see how chalets were modified in two or three-part house, how the logs first shift with wattle and adobe, and then with bricks, how unusually quickly new types of house appeared and

spread. Is not far away the time when the old types, especially chalets will disappear, you will need to look them only in remoted mountain areas, almost like we're now looking for sibara and busara" (p. 206).

CONCLUSION

Travelling across the Balkan Peninsula Jovan Cvijić has researched, analyzed and linked from partial to complete, from general to particular, from the past to the future, enhancing our science at European and world level and leaving a rich scientific heritage, including ethnographic studies. Phenomena and processes in nature and society observed multidisciplinary so the choice of place of establishment and economy, the construction of houses and other buildings explained with the influence of the natural environment and habitats. House types have changed under the influence of economic development of individual regions and different styles of construction, which were intersected, and they, according to Cvijić, were very difficult to separate. Today, in our time, all the colorful folklore of traditional construction and architecture vanishes. There are no more houses of charge, there are no chalets that carpenters and masons used to create without a single iron nail and wedge, Moravian houses, witnesses of their time and people who lived in them are also rare. Resistant stone houses of coastal areas are still withstanding, and today are monuments of their own time, many of them in villages from which the population emigrated long ago. Leaving behind the old constructions the old construction trades are also left. Ever fewer masters in wood and stone build and sculpt. It has been evidently performed modern, urban construction with application of modern materials, introducing a new uniform in architecture to all regions. Such processes are unavoidable, often useful and practical, but it would be good for old buildings and architectural styles to be protected, transformed and combined with a new way of life. In that way the new modern buildings with precious old elements would have historical, folklore and tourism value (Markoska & Lukić, 2006). The destruction of the last samples of folk architecture is the alienation of the national spirit and cultural heritage and it certainly should be prevented in order to preserve cultural identity of nation (Lj. Grčić & M. Grčić, 2007).

Traditional architecture reflects the cultural-historical, socio-economic, natural and technical opportunities of specific time. Today houses are significantly different comparing to old houses, and in the structural and spatial solutions they can not be classified into specific house types (Rodić, 2010). Jovan Cvijić preserved from oblivion the names of these old

house types. He did not miss the specific economic buildings, which for the villagers were almost important like a house, mentioned the names of the houses and buildings related to livestock settlements and temporary villages, and briefly commented a new type of house in the Balkan Peninsula related to increasing of productive forces and the progress of culture and civilization. Many of these house types from the late 19th century until now have vanished or have been only individually held and Cvijić preserved their names from oblivion. His ethnological significance for the study of the old national architecture of the Balkans is not only in preserving the old names and described the types of houses, but in the fact that he in concrete method, showed his followers how they should study the house. Today, none of these forms of house is not built. However, some of these houses are preserved and today they are museums with cultural, ethnological and tourist importance.

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POLITICAL GEOGRAPHY



JOVAN CVIJIĆ AND HEADQUARTERS MAP OF THE KINGDOM OF SERBIA 1: 75.000

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ABSTRACT: The paper discusses the critical reviews that Jovan Cvijić gave (1889 and 1894) on the headquarters 1: 75,000 scale map of the Kingdom of Serbia, the first map of Serbia created by topographic survey. This map is one of the most important maps in Serbian cartography history. Even though Cvijić was very young and at the beginning of his career, he nevertheless clearly showed some of the characteristics and interests which remained consistent throughout his career and life. In the first review (he wrote it when he was 24 years old) we could see something that marked his future work and that is the interest in the karst and karst forms. The publisher's response (Geographical Department Directorate) testifies to the reputation which Cvijić has enjoyed in Serbia before the age of 30 and shows which of the Cvijić's remarks were adopted. It also points to other links that Cvijić had with this map as a reliable source for the first edition of his famous 1: 750,000 scale map of Serbia and Montenegro.

Key words: Jovan Cvijić, Headquarters Map of Serbia, 19th century

INTRODUCTION

Headquarters map of the Kingdom of Serbia in scale 1: 75.000 is the first topographic map of the territory of Serbia created by land survey. The complete work, from the land survey to drafting and printing of the map was done by Geographical Department of the Main Headquarters (now the Military Geographical Institute), in the period from 1881, when the survey was initiated, till 1895 when the out last, 95th sheet, was published.

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Until then, the General map of Europe in scale 1: 300.000 published by the Viennese Military Geographical Institute in 1876 - just before the Serbo-Turkish wars for freedom and independence - was being used as the most reliable map of Serbia. With the help from two Serbian officers, Austrians set the coordinates and altitudes of about 200 points (Radojčić & Srdić, 2014) on the territory of Serbia in 1874, which, together with the delivered maps of districts that Serbian staff officers croquered with Hosard's compass in 1869 and in 1870, made the territory of the vassal Principality of Serbia appear authentic and, within the limits of scale, exact. However, due to a small-scale ratio and a significant territorial expansion of Serbia (based on the decisions of the Berlin Congress in 1878) - and until recently Turkish territory on which the Austrian map did not have the necessary accuracy because the data was collected surreptitiously, without survey - the issue of the new survey of Serbia and the producing of the larger scale map of the newly formed state became a military and a national priority.

Headquarters map of the Kingdom of Serbia 1: 75.000 (further in this document HQM75) is one of the most important maps in the history of our cartography. Besides being used for military purposes, the map was also used for a number of scientific, educational, administrative and other necessities of the whole society. With a few occasional amendments and new editions, this map was used for several decades and even after the First World War, in the Kingdom of SHS (Yugoslavia), when the military maps in the scale of 1: 50.000 and 1: 100.000 were made for the same area. All that time, it served as the main cartographic source for maps of smaller scale which were produced by the Department of Geography (the Military Geographical Institute) over a period of approximately 40 years (Bošković, 1931).

THE PRODUCING AND PUBLISHING OF THE HEADQUARTERS MAP OF THE KINGDOM OF SERBIA

Preparations for topographic survey and map producing

From December 1/13 in 1878, along with the transition of army to a peaceful formation when Department of Geography started its work, and up until June 1881, when the topographs entered the field for the first time, extensive and highly complex preparation for survey and producing and printing of the map was carried out. Taking into consideration the difficult post-war situation and the urgent need for topographic map of the newly formed state, there was a search for the simplest and cheapest solution. The complexity of preparation was influenced by the fact that many issues

related to the survey and producing of the map were being decided on for the first time in history of military and even national cartography in Serbia.

It was decided that the survey was to be done graphically, on a small geodesic table with the usage of geodesic viewers (diopter with a ruler) and a compass (wherein altitude is measured by barometric altimeter with the usage of aneroids), in scale 1: 50.000, and that the map itself was to be made in scale 1: 75.000. The division into sheets and nomenclature was identical to the field originals (in the scale of 1: 50.000) and map sheets (1: 75.000), which is shown on Figure 1; the only difference was in the dimensions: field original 55x50 cm, and map sheet 36,67x33,33 cm. Division into sheets was rectangular, the prime meridian was Parisian and height was determined in correlation to the mean sea level of the Black Sea.

	А	Б	В	Г	Д	Е	Ж	З	И	Ј	К	Л				
1	Граница Бујуклић Ада	Милеровић	Деловоцац		Београд		Рам						1			
2	Лешница	Дер брдо	Шабан	Деловоцац	Авала	Кралево	Велика Градина	Пожаревац	Трбава	Тешан	Кралево		2			
3	Лозница	Јадар	Каменица	Уб	Сопот	Паланка	Жабаре	Петровац	Мајданпек	Доњи Милановац	Паланка		3			
4	Црча	Србобуја	Ваљево	Мноница	Аранбеловац	Рача	Свилајинац	Горњак Клисура	Жагубица	Дели- Јован	Негош		4			
5	В.Стопан	Битва	Косјерићи	Чачак	Горњи Милановац	Крагујевац	Јагодина	Раваница	Бања Брестовачка	Зајечар	Рајач		5			
6		Златибор планина	Ужице	Ариље	Краљево	Чукојевац	Варварин	Параћин	Бољевац	Краљево Село	Седло Мрочина		6			
7		Увац	Иваница планина	Иваница	Студеница	Грстеник	Крушевац	Алексинач	Соко Бања	Књажевац	Свети Никола		7			
8			Голија планина	Брњица	Брус	Ланкова Клисура	Прокупље	Ниш	Бела Паланка	Темска	Кралево		8			
9	БЕНЕРАЛШТАБНА КАРТА КРАЉЕВИНЕ СРБИЈЕ 1:75 000 Подела на секције					Пилатовица	Шумлија	Житин Поток	Лесковац	Сува Планина	Пирот	Ржана	9			
10						Подужево	Мркоњ	Ветерница	Власотинца						10	
11									Сврци	Брања	Власина					11
12										Давидовац	Бабина Пољана					12
	А	Б	В	Г	Д	Е	Ж	З	И	Ј	К	Л				

Fig. 1. Review sheet of the Headquarters map of the Kingdom of Serbia 1:75.0000, Military Geographical Institute, Belgrade

Graphical triangulation was to be taken as the mathematical basis, and it was to be successively developed from trigonometric points which were partly set by Russians during the survey of Bulgaria (1878–1880), and partly by the international board which, in accordance with the decisions of

Congress of Berlin, determined and marked the border of the Principality of Serbia with Bulgaria and Turkey. The points set by the Viennese VGI on the territory of Serbia in 1874 while working on the General map of Europe in scale 1: 300.000 were to serve as verification points.

It was also decided that the relief would be presented by the contour lines, with equidistance of 50m. This led to the increasing of the psychometric properties of the map, and demanded each sheet to be determined by the relatively large number of heights, ie. about 700 to 1.000 points per sheet. In order to ensure the required accuracy of height survey, it was necessary to develop a relatively complex system of the barometric stations (I, II and III class), which further required detailed regulation of all actions in the field, as well as an appropriate metrological assurance (in more detail: Simonović, 1896a).

Along with the preparation of topographic survey, the first standards in domestic cartography were accepted: topographic and cartographic key (Radošević, 1987) and the corresponding userguide for fieldwork (Simonović, 1896a). Besides that, a lithography workshop was established, and serving as a kind of test of readiness of the Department of Geography to produce and print maps, just before the start of the survey, in 1881, a map of the Basin of Južna Morava was produced and printed: the middle part in scale 1: 300.000 (in three colors, dimensions 72x55 cm).



Fig. 2. Map of Južna Morava river basin, scale 1:300 000, The Military Geographical Institute, Belgrade

Topographic survey, cartographic processing and printing of the map

The survey was initiated in 1881 from the south to the north and after a year or two of practical fieldwork, the work went on without delay and trouble, as a part of routine, until the end of survey in 1892.

Since there were only five officers serving in the Department of Geography at the beginning of the works, the so-called interns for Headquarters profession ie. officers of the rank of lieutenant or a captain who attended the two-year course to switch to the Headquarters service - the most elite service in the Serbian Army - were sent to the Department each year. Since 1886, some young officers from the troops who went through the contested election, took participation in the survey. In the period from 1881 to 1892, a total of 31 officers took participation in the survey (Radojčić, 2003). The unusually large number of officers who reached the highest military ranks in the later service were among them (three Dukes and four generals) and ministers of military or Civil engineering (four persons).

The works on cartographic processing and printing of the HQM75 initially went on very slowly: the first sheets came out from the press in 1884, and there were only 34 sheets printed by 1889. The cause of a poor dynamics was a chronic shortage of professionals, qualified cartographic draftsman and graphic workers, despite constant announcement of Vacancies being published in the neighboring Austria-Hungary. However, over time the situation changed for the better, so that the last sheet was printed in 1894. That same year, the printing of new circulation was initiated, because the first edition was sold out in a very short period of time. The second circulation had an extra sheet - K6, the 95th sheet of the HQM75 - created and printed. The map was printed in the photolithographic process in five colors: black for the names, rivers, roads, vineyards and ponds; the brown (brown) for relief; green for vegetation; red for dams and blue for rivers Sava and Danube.

CRITICAL REVIEW ON THE HQM75

With the release of the first sheets of the HQM75 from the press, came the critical reviews of domestic and foreign experts. As a part of the Ninth Congress of the German geographers, the map was presented with 9 sheets at the exhibition in Vienna, held on Easter 1891 (Cvijić, 1894), which made the map available to the general public. Among others, criticism and opinions were given by the member of the Berlin Academy of Sciences K. Fogel (Carl Fogel, 1828–1897), professor of geography at Vienna University V.

Tomašek (Wilhelm Tomaschek, 1841–1901), as well as the editorial board of several leading expert journals (A. Petermann, *Mitteilungen aus Justus Perthes Geographischer Anstalt*, *Geographisches Jahrbuch*, *Mitteilungen das k.u.k. MGI*, *Petermann Mittheilungen*, etc.).

What is common for all the critics is that this undertaking of the Department of Geography and the newly founded Serbian state was greeted with affection and satisfaction that this part of the Balkans had been presented with a detailed map which was also necessary outside the borders of Serbia. At the same time, critics had shown great understanding for the consequences of the lack of financial, technical and personnel support for this work.

And our Jovan Cvijić (1865–1927) gave statements concerning this topic: first in 1889 in the 19th and 20th number of the *Kola*, and then in 1894 in his *Review of the geographical literature on the Balkan Peninsula* (Vol. II for 1892 and 1893). And his criticism, mostly given in commendable overtones, also provided some very concrete remarks and proposals, partly based on checks done on the field. The way Cvijić analyzes these maps, the way he forwards his viewpoints and the content of his reviews speaks a lot not only about this map, but also about Cvijić.

Cvijić's review from 1889

When he was writing a review for the magazine *Kolo*, Cvijić had 34 sheets of HQM75 in front of him, which was the number of sheets issued till that period. In the introduction part, he gives a kind of retrospective of maps of Serbia, from the mid-18th century to the latest editions and concludes that, despite their relatively large number (about 50), "there is a very small number of those that would give an accurate picture of plastic of terrain, and there are almost none, even among the special maps of individual regions, which would not fail the traveler on the field. Most of these maps are more or less of crude production". Cvijić noted that there are maps, "which have speculation as a cause of their production" and those "whose purpose contains causes of wicked creation" (Radojčić, 1998, 10), he understand "the scarcity of a more reliable technical training" common for almost all publishers of these maps and the technical production problems, but he saw the "insufficiently traveled terrain" as the main cause of "a poor value" holding that it had been "an obstacle that had impeded even the best maps of Serbia to have enough accuracy and detail" (Radojčić, 1998, 29).

The second part of Cvijić's review was devoted to the HQM75 itself. After a brief description of the main features of the map (the number

of sheets, the number of colors, the manner in which the relief was displayed, etc.), he compared it with the previously mentioned Austrian map 1: 300.000, which was considered the best for Serbia at that time. He noticed that the Department of Geography used a more reliable geodesic basis than the Austrians, that "heights were determined independently, without relying on Austrian maps" and that "it seemed that the map was based on the new or the rarely old, and verified data". He noticed a big difference in the configuration of the terrain, the extension directions of certain rivers, names, etc., but he only briefly commented, noting that "for the connoisseur of the terrain, there was no doubt that this one contained the real map of our Headquarters" (Radojčić, 1998, 33). Based on this comparison, Cvijić concluded that the HQM75 "differentiated in great deal from the whole previous cartography".

Further on, Cvijić conducted a detailed analysis of three sheets ("sections") HQM75: two which, as he stated, he used on the field - Ravanica (Z-5) and Vranje (I-11) and one which he only used for the comparison of geographical names (names) with the names that the same places had in previously published sources - Bela Palanka (J-8). Cvijić gave few remarks on the sheet Ravanica (that one place had not a single marked sinkholes, although there were many; they were shown on the other side, although there were not any there; that an underground stream was not shown, that two objects" as far as we could discern, are not in the place on the map"; that one extra contour line "presumably requires verification", etc.), three of which were related to names. On the other hand, the remarks to the sheet Vranje, were related to names with one exception; in general, on this sheet, Cvijić says, "there are many errors in the names of places. Nearly one third of them is wrong." He stated approximately nine false names and gave the correct names, with an explanation for each. For Bela Palanka Cvijić gave nine names for which he thought were wrong or they might have been. Though it must be said that he was only categorical for two names to be wrong, and for the other seven he stated that they "do not agree with the literature" and he in somewhat distanced his judgement ("it is very possible that the last three names are from the real map of our Headquarter").

Based on these analysis, Cvijić concluded: "We discussed only two sections of the map in detail, and certainly there will be small topographical errors and incorrect names in others as well. But our map of the Headquarters compared to the prior cartography is still a great progress; this map took the cartography of Serbia a long way further." (Radojčić, 1998, 40). It is believed that the topographic inaccuracies "few of which

are present” could be avoided in the future if there’d be more “traveling through the land”. Mistakes in names could also be prevented if published sources were reviewed before going to field and possible disagreements spotted and then carefully resolved on the field.

And he adds: “In addition, this map represents a great wealth of our topographical names and gives the abundance of lexical items. Creating its topographic vocabulary would be of great value and would make the usage of this map easier.” (Radojčić, 1998, 48).

Cvijić’s review from 1894

Five years after this review, in the II volume of the Views of the geographic literature of the Balkan Peninsula, Cvijić again refers to the HQM75 concerning the press release of the Headquarters that the work on it is complete. In this review Cvijić first briefly lists the main characteristics of the map and the modus of its production, and concludes: “Inexpensively and with a weak support, the Headquarters gave us a special map of Serbia, which is a major improvement to the previous maps and creates a separate period in the development of cartography of Serbia” (Radojčić, 1998, 40).

In the second part of the article, he makes a specific retrospective of the most significant maps of Serbia from ancient times up to the latest works, with a focus on local authors and maps. This part of the paragraph is concluded with a viewpoint that all those maps, “except the oldest where the accuracy should not be sought”, are only “agonizing efforts of individuals to better present the cartographic image of Serbia”, and that a complete result could not have been achieved “without the great work which would encompass the whole country and would be executed in accordance with one plan”, ie. “until it was taken by the body that produces all the special maps¹” (Radojčić, 1998, 50).

Then he gave a few remarks on the HQM75:

- “Solely about the surveying businesses”... “cannot be spoken of until the Headquarters exposes the method by which it was done; and that was supposed to be done by now”.
- Contour lines are interpolated based on a small number of points, whose heights are yet unreliable because they were all done by aneroid in relation to the barometer at the Military Academy (“my measurements in the field of Devica and Ozren disagree almost anywhere with elevations of the special map”).

1 Refers to Geographical department Main Headquarters, authors' remark

- Geographical objects on the map are shown uneven and irregular: “in the section Soko Banja left tributaries of Moravica were presented as longer rivers that emerge on the same side as Ozren and Device. There are no creeks there, but only fountainheads on the banks of river bed Moravica. The same case is seen in many other sections, such as Rtanjska (Boljevac), Svrlijska (Derven), etc.”.
- “There are a lot of names written wrong “...”and I could now make a long list of such names; this can be the easiest and quickest way to help the Headquarters “.
- Updating maps is important and constant work should be done on it. “With the exception of sections of Avala and Niš, nothing was done on the matter. If that continues for few more years, the special map will be obsolete”.

At the end of this review, Cvijić concluded: “In presenting these big mistakes and tasks that are absolutely necessary to be done as soon as possible for the sake of correction of the special map, I must once again emphasize the great value of this work, which will always serve as a pride of Serbian Headquarters” (Radojčić, 1998, 55).

RESPONSE OF THE HEADQUARTERS

The Headquarters did not respond to the remarks from 1889. Perhaps due to the fact that they were signed by an unrecognized expert, who had graduated not long before and immediately grabbed the task of assessing the work of the Headquarters. However, when Cvijić referred to the HQM75 again in 1894, relying on the remarks he had made in 1889, Cvijić had already gained a considerable reputation in Serbia, due to the fact that he received his doctorate in Vienna, that he was a professor at the Great School (at which he founded Geographical Institute which he managed), that he had released several notable scientific papers and studies, that he has launched and edited an expert journal, etc. In one word, he already had a significant scientific authority which could not be neglected.

The Headquarters responded to Cvijić in 1896, in the form of a book titled *The first topographic survey* of the Kingdom of Serbia (volume 333 pages) signed by one of the participants of the topographic surveys, Lt. Col. Josif Đ. Simonović. The book explains in detail all actions and processes of importance for HQM75 from preparation (who had done it, which dilemma they had, how were those resolved etc.) through the process of survey (mathematical basis, instruments, methods of operation, topogra-

phy, work instructions etc.) and all the way to the drawing and printing of the map, and finally the prices of all the work were presented as well as the previously given criticism from domestic and foreign literature. It was in that part where these two Cvijić's reviews were transcribed and stated. He began with these words: "The first criticism of our special map, in our literature, was written in 1889., by the diligent and tireless worker on the knowledge of our homeland, a High School professor of Geography, Dr. Jovan Cvijić." This sentence showed what type of reputation Cvijić enjoyed in Serbian public, before he was thirty and before he gave what is now considered his greatest scientific contributions.

However, an act *Response to criticism* (ĐA Nr. 434) was also published in the book, by which Headquarters gave a response to the Cvijić's criticism and rejected almost all of it. "It appears to us" - says Simonović in response - "that Mr Dr. Cvijić did not bear in mind one major moment under which our map had been made, and that is that the present edition of it is *temporary*." Indeed, each sheet of the HQM75 had - "Temporary release" printed outside the framework (in the top right corner), whereby the Department of Geography, aware that they would not always be able to provide good and consistent quality of each sheet in the given circumstances, distanced themselves in advance from certain based critics.

Cvijić's remarks to the accuracy of height were also dropped, after a detailed explanation of the whole process of establishment of the network of barometric stations with three lines, by which the famous geodesic principle of "descending order" was followed. Indeed, no remarks can be directed to the Department of Geography neither from the contemporary standpoint; from the metrological point of view these works were organized flawlessly (Radojčić, 2003). Similarly, Cvijić's remark that the contour lines were interpolated based on an insufficient number of points was also denied, pointing out that the interpolation was performed on the basis of 700 to 1.000 elevation points per sheet (depending on the complexity of the relief), and that in the end only the most significant elevations were drawn, and not all (because it would have overloaded the map).

Concerning the complaints relating to the hydrographic network (sheets *Soko Banja*, *Boljevac* and *Svrljig*), Simonović only acknowledges it, but what the officer-topographer recorded on the ground would remain applicable until the survey was done again.

He continues: "Headquarters has a completely different viewpoint on the remarks given by the respected and diligent worker on the knowledge of our Fatherland, Professor Dr. J. Cvijić stated in the 19th and 20th issue of "Kola" concerning his viewpoint on the topographic names on our

map". Simonović agreed that there were and can be errors in names but he stated that discussing this issues was not always simple. "It is a known that not even the villagers agree on the names of their closest environment and tradition, personal taste and phonetic feelings of individuals play a major role " ... "and then the topograph, who can not be a philologist at the same time, faces difficulties in finding the real truth". Simonović cited other possible reasons which may have caused some names to be incorrect, and concluded that "they hope that what could not be achieved in the first edition, would be achieved in future editions of the map, on which they continuously work."

Finally, Cvijić's claim that only the sheets of Niš and Avala were updated (re-made) is also denied and it was stated that another 10 sheets have been updated in its entirety and that three were partly updated. "This work of controlling and reambulation of sections on the field will continue and due to the labor force will be continuously performed, because that is required not only by the manner of creation of this map, but also by changes on the ground"².

Cvijić's comment on response of Headquarters

In the third workbook of Views of geographic literature on the Balkan Peninsula (Cvijić & Simonović, 1897), by displaying Simonović's book, Cvijić confirmed that he had received a reply to his criticism from the Headquarters with a request for it to be printed in the Review, but the Review had already been published in the book of J. Simonović. Cvijić said that this was the reason he would not have it re-printed, but would comment along with the presentation of the book, "in convenient places." He continues: "I state in advance that I was not properly informed about the way the Headquarters measured height for the special map. Officially, the only proper notice was given by Headquarters in the book of J. Simonović. Concerning other matters I launched in the reports which did not require prior notice to be discuss, I state that I still do not agree with Headquarters". On this occasion, Cvijić gave a new remark: "I find it inconvenient that the map of our Headquarters is in scale 1: 75.000; it is known that with this scale it is difficult to carry out the reduction in round numbers (eg. Map scale 1: 200.000), or convert length from nature to such scale and conversely". But now he commended some things: "With the division of sheets into sections, a proper system was adopted" ... "The measuring of heights was carried out quite properly" ... " working directions were given by our great surveyor and cartographer R. Miletić".

2 Today we know that listed data are correct. Otherwise, HKM75 is till 1912 three times updated fully (all sheets), and some sheets more than that.

CONCLUSION

Jovan Cvijić gave both of his reviews of the HQM75 at the beginning of his professional career - first when he was 24, and the second when he was 29. This, however, can not be noticed; a contemporary reader of these reviews can see a mature and completely formed author - insightful, systematic and authoritative – the same way he is seen by the reader of his most important works created later, at the peak of his career. Even the language he used seems modern and fresh, without archaisms his contemporaries (especially soldiers) frequently reached for.

Even in the first review we could see something that would mark his future work: first, the interest in the karst and karst forms (“first we observe how three large sinkholes were presented“...), a subject which he would later (in 1892) base his doctorate on and to which he would give invaluable contribution and secondly, the claim that the study of the phenomena of the land takes a good “travel through the terrain.” Although he was merely at the beginning of his career in 1889 and had only one field study performed, it was obvious that he had no doubts about the need and importance of fieldwork, which he adhered to throughout his career, traveling and exploring the field for 38 years (Vasović, 1994). This is why Simonović refers to him in 1894 as a “diligent and tireless worker on the knowledge of our homeland”. After all, the objections to the HQM75 were based on his own observations on the field (on which he dwelled for other reasons), unlike other critics who gave statements on a map from their cabinets.

Cvijić’s proposal to create “topographic vocabulary” of the map or directory (vocabulary) of geographical names, as it is called today, deserves special attention. Specifically, he is the first one who connects the fact that all the names on the HQM75 were collected directly in the field, that there are many and that their recording and systematization in a form of appropriate directory (dictionaries, denominator) would be of wider benefits. It should be said that the young Cvijić was farsighted in regards to this. If this proposal was realized - and that could have been done easily and quickly - maybe the toponymy of Serbia would go in the other direction and now we might have had this area arranged at least at the level of nowadays European average. Thus, Serbia still does not possess valid record of geographical names (except names of settlements).

It is interesting that the Geographical section closely examined other received remarks in later editions, as they promised in response to Cvijić. This can be seen if we compare the first edition (which Cvijić had in his hands) and the last, issued before the Balkan wars. Thus, for example, on

the sheet Ravanica the name Trgovište was changed into Torovište, karst field without a name (Cvijić said it was Targolan) got its name (Troglan bara), the name Suvača was changed (although not in Dršljivica as Cvijić claimed was proper, but in Suva Reka) and on the sheet of Bela Palanka were two of nine names, that Cvijić had objections too, were corrected (Burdim to Burdimo and Đurinać to Đurinci), including one for which Cvijić was not certain about.

Along with the release of the last press sheets of the HQM75, Cvijić comes up with the idea to use this map to determine the area of the Kingdom of Serbia (with polar planimeter). The Geographic Institute of High School "by initiative, and under instructions and the daily supervision of Mr. Cvijić" (Radivojević & Simonović, 1897), worked on this task for two years, until spring 1896, when the result obtained (48,297.4 km²) was communicated to the Headquarters. Although, the formal value was later determined by the Geographical Department (Simonović, 1896b), Cvijić still takes the priority, and it is possible that his data was more accurate (detailed in Radivojević, 1897).

Finally, it should be noted that J. Cvijić used Headquarters map in scale 1: 75.000 as a reliable source for the first edition of his famous map of Serbia and Montenegro in scale 1: 750.000 (published in Vienna in 1897).

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GEOGRAPHICAL RESEARCH OF ISOLATION AND SEPARATION FEATURES OF THE BALKANS IN THE TIME OF CVIJIĆ AND TODAY

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ABSTRACT: The Balkan Peninsula is a geographical region of contacts and permeation of different civilizations, but of isolation and separation of its peoples, too. Through history, on the territory of the peninsula interests of economic, political and military powers merged, the main reasons being political and military. Historical processes that marked the last decade of the 20th century on the Balkan Peninsula were not in accordance with the integration processes in Europe, which took place after the Second World War, and whose intensity heightened after the fall of the Berlin Wall and the reunification of the two parts of Germany. Most nations in the region were not ready economically and politically to accept social changes in Europe and were therefore isolated and separated in most cases. The paper focuses on the geographical research of the isolation and separation features of the peoples of the Balkan Peninsula at the time of Cvijić and today through the prism of contemporary political and economic processes.

Key words: The Balkan Peninsula, political and economic interests, isolation and separation features, integration processes

INTRODUCTION

Because of its geographical location, its multiethnic, multilingual and multicultural mosaic, economic and political processes, the Balkan Peninsula has been the object of study for geographers, demographers, politicologists, culturologists, historians and other scholars within complex multi-disciplinary research. Most of the Balkan countries are in the post-socialist period of development and are facing diverse problems resulting

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from political and economic reforms, whose aims are to modernize these fundamentally autarchic societies.

The last decade of the 20th century and the first of the 21st century were marked by the process of globalization, which “forced” the states of the Balkan Peninsula to transform themselves from more or less isolated in the “open” ones so as to be able to join European and global political, economic and cultural trends. Contemporary political order is developing under the conditions of postmodern relations in Europe, which differ from the conditions that existed previously in the period of the Cold War. It was only about 500 years ago, that Columbus’ map of the world, before the discovery of America, was largely empty and marked as *Terra incognita*. The then European societies, separated as oases in deserts, create today through numerous connections a connected system of global values, which is intertwined with political, economic and cultural interests. In his acclaimed book from 1922 “The Balkan Peninsula and the South Slavic countries” Jovan Cvijić indicated that despite the fact that on the territory of South East Europe contacts and influences of diverse civilizations converge, processes of isolation and separation of their peoples simultaneously exist.

Two decades ago, global integration processes were a distant idea for the peoples of the Balkan Peninsula. By the middle of the second decade of the 21st century, these processes started to shape more intensively political, economic and cultural life of the Balkan countries. Multinational companies in their search for the most favorable terms of doing business and making profit, cheap labor force and resources are traversing the world and bringing about changes in the Balkan Peninsula region. Transnational economic powers are demonstrating more and more domination over local and national economies in the region. Information and media messages are crossing the boundaries of the Balkan Peninsula and reshaping the geographic area Cvijić wrote about in his “The Balkan Peninsula and the South Slavic countries”.

Globalization creates opportunities for linking national economies and expanding national markets, but it also increases economic and social vulnerability of the Balkan countries such as Serbia. In terms of culture, globalization allows meeting different cultures on one hand, while on the other it creates uniformity of cultural values. In such circumstances there is a risk of rejecting one’s own culture for the sake of accepting global monoculture (Šabić & Vujadinović, 2014). As every kind of isolation from global flows is harmful, it is equally detrimental to apply blindly the instruments of global economic, political and cultural homogeneity that

impoverish national economies. Unfortunately, this type of globalization is largely implemented in each country of the Balkan Peninsula. Countries of the Balkan Peninsula have their natural and social specific features on which they develop and build their social and political systems. In these processes of globalization the Balkan countries should accept only what leads to strengthening of their own economies but also to improving and strengthening relations with neighboring countries (Šabić, 2011).

GEOGRAPHICAL INTERPRETATIONS OF CERTAIN FEATURES OF THE BALKAN PENINSULA IN THE TIME OF CVIJIĆ AND TODAY

Cvijić (1922) states that geographical conditions, especially high mountains, were “massive bars” that caused nations “to divide and thus weaken and exhaust”. He also states that “... human groups that inhabited isolated areas stayed closed and had, to a certain point, distinct development, which is different from the development of other groups residing in the areas of mergers and permeation on the Balkan Peninsula ... Numerous geographical factors are the cause of separation ... Even small rivers with low but marshy banks, prevent human movement and present border lines between certain ethnic groups in the Balkans. This role is even more evident with rivers, whose valleys are deep and steep-sided, such as Morača, Piva and Tara canyons that divide mountainous tribes of the Montenegrin Hills...”. Unfortunately, even today one can conclude that some of the Balkan rivers present borders that separate the same or different nations, as is the case with the Drina and Ibar rivers in Kosovo and Metohija.

Mountains and marshy valleys, as stated by Cvijić (1922), “especially when they are covered by dense forests present considerable obstacles to traffic. Medieval roads, which were used by caravans, avoided marshy valleys and gorges, and went along the mountain sides and ridges ... Roman roads rarely avoided gorges and valleys” and linked villages and provinces. Modern roads - regional, motorways and highways follow their routes today in the region. The most important Roman road was the Military Road (lat. Via Militaris), which led from Belgrade (Singidunum) through Požarevac (Viminatium), Niš (Naissus), Sofia (Serdica), Edirne (Hadrianopolis) all the way to Constantinople. This road was linked with Egnatia Road (lat. Via Egnatia) through the Vardar Valley in the southern part of the Balkan Peninsula. In the Middle Ages, the Constantinople Road was one of the most important roads in the Balkan Peninsula, which connected Belgrade to Istanbul. Today, the main regional road E-80 follows this route, the eastern branch of the Corridor 10 (Salzburg - Zagreb - Belgrade - Niš - Sofia - Istanbul).

The unity of the Roman Empire was based on the organized administrative, military and transport infrastructure. Transport links, as Bordman points out (1999), made it possible for the largest part of the Balkan Peninsula, which was under the administration of the Roman Empire, to be integrated into a common set of legal norms. Geopolitical instrument for conquering and later protecting the Roman Empire was the limes (lat. Limes). The term limes was originally used for roads in less accessible regions, and in the last centuries of the Roman Empire it became the transitional zone between the empire and barbarians, between the law and arbitrariness. The most famous example of the Roman limes on the Balkan Peninsula was Moesian limes (lat. Limes Moesiae) on the Danube. Historical circumstances have changed and today the Danube presents a factor of integration and cohesion of the Danubian countries. Corridor 7 or the Danube pan-European corridor is one of the most important European routes, which together with the Rhine and Main forms the most important waterway in the continent.

Cvijić (1922) states that “the greatest obstacle to human movement in the past, and thus a constant factor of isolation and separation, were mountain ranges composed of more ridges and high plateaus, separated by valleys or deep, closed depressions. Of the same importance are mountainous areas divided into numerous isolated basins...”. Cvijić also says that the Dinaric Arc was unable to prevent the Serbs and Croats “to settle all over it. Mountain ranges do not resist ethnic penetration as much as ethnic movements arising from human activities and the currents of civilization.” Centralni Balkan (The Central Balkan) and Srednja Gora (the Central Hill) did not prevent the Bulgarians to cross over from one side to the other, but divide northern areas with patriarchal and Turkish-Oriental regime from Southern areas with strong traces of the old Byzantine civilization. A typical example of isolation in modern circumstances, “separation into regions”, as stated by Cvijić (1922), are the Pomaks in Bulgaria. These are the Bulgarians of the Islamic faith who live mostly in Pazardzhik and Blagoevgrad. They preserved many archaic elements, which incurred during the period of Turkish-Oriental influences in their language, material and spiritual culture due to the isolating way of life. Similar situation can be found with Torbeshi, an ethnic group of Macedonians, whose members accepted Islam during the Ottoman rule, like the Pomaks in Bulgaria. Unlike the Pomaks and Torbeshis, Goranci present an ethnic community that embraced Islam in the 16th century but preserved many Slovene customs (Славейков, 2006).

Mountain massifs as Cvijić emphasized led to the situation in which “the population remained more or less isolated. These massifs look like

huge islands, around which historic waves and currents of civilization crashed, like silent and secluded shelters for protecting population that fled from turmoils of successive invasions. The old Balkan livestock herding, shepards' movements and some old crafts have been preserved and developed in the most original form here, as well as the clearest forms of patriarchal life and tribal organization... It was difficult for the Turks to penetrate into the interior of the Dinara massif, because these were peripheral areas for them, far away from Constantinople, and in them Turkish influences were the weakest." Some parts of the Balkan Peninsula, such as the Montenegrin hills and regions, a real mountainous and karst fortress, remained almost completely isolated, and in social terms behaved as islands..." (Cvijić, 1922). From today's point of view, Cvijić's claims are evident in the typical example of the inhabitants of the mountainous part of Montenegro, who have still kept the characteristics of tribal affiliations and segments of traditional way of life.

Judging by the traces left by ancient people, which survived in the mountainous massifs of the Balkan Peninsula, but are disappearing nowadays, "we can trace down various stages of ethnic assimilations that had previously occurred on the peninsula. Here, as almost everywhere in mountainous areas, the most resistant bases of autonomous and independent life of free highlanders had their roots and kept surviving" or of parishioners, as is the case with the Goranci in southern Kosovo and Metohija (Cvijić, 1922). Despite the cultural and political influence of the Albanian population, they managed to maintain their ethnic and cultural identity and resist assimilation until today. Cvijić (1922) pointed out that the Adriatic coast in Albania, mainly marshy, did not attract migratory currents in the past. This is one of the main causes why the Albanians preserved their ethnic identity and remained from ancient times until today in this region. Unlike the Albanians, the central part of the Balkan mountain and Srednja Gora (the Central Hill) in Bulgaria evidenced assimilations in the past. There, as Cvijić writes (1922), in the Middle Ages the Aromanians or Vlachs, who rebelled against the Byzantine Empire and formed a Vlach-Bulgarian Empire, withdrew. However, during the following centuries, they became completely assimilated by the Bulgarians. Very few traces of Vlach-Bulgarian origin were preserved in anthropological types and psychological characteristics.

While studying the Balkan Peninsula, Cvijić used to emphasize that through history its mountainous valley basins had always been the starting point of migration currents, which for themselves had been a constant factor of integration and permeation.

Migrations have been in the focus of scientific research since the time of Cvijić. Regardless of their causes and consequences, migrations marked different historical periods of the Balkan Peninsula and largely redefined its spatial and functional organization, its settlement and demographic features. Following current political and socio-economic trends in Europe the character of migrations in the Balkan area has been gaining a different dimension. Intense forced migrations, combined with economic migrations are typical for the period of disintegration of socialist systems in Central and Eastern Europe and the cause of outbreak of the Balkan wars. Serbia faced great challenges at the time as it had become a country of refuge, transit and origin of many people who for various reasons had to leave their homes. In 2011 in Serbia there were 30,000 registered refugees and 210,000 internally displaced persons from Kosovo and Metohija (Vujadinović et al., 2013).

A unique phenomenon of exile is its cultural specific feature that was reflected in the "conflict" of urban and rural way of life, which often acquired forms of social intolerance. Local political structures manipulated with the destiny of refugees. They would treat the refugees as patriots at one point, then at another as victims and heroes. For this reason, many urban areas showed utter reticence and restraint towards the wave of refugees since allegedly the city lifestyle was "threatened" by refugees. The media reflected political-economic and cultural aspects of the new situation. Over time, with the calming of the political and security situation in the region, the above mentioned tensions weakened, which is evidenced in the fact that the majority of refugees expressed desire to continue living in Serbia. This made the integration of refugees a constant challenge for the state and local authorities and gave it even more importance in the years to come.

Serbia has long been a transit country for a large number of illegal migrants on their way to Western Europe. Although Serbia is just a transit point for most of them, the question of adequate accommodation of these asylum seekers in times of economic crisis presents a major challenge for the country. On the other hand, the emigration movements from Serbia during the war years and asylum seekers marked the nineties of the 20th century. In the first decade of the 21st century, Serbia was among the top five countries in the world in the number of asylum seekers in European countries. A large number of failed asylum seekers from Serbia, who were sent back to Serbia in accordance with the Law on readmission, brings additional strain on the state (Vujadinović et al., 2013).

Unlike migrations resulting from the political instability of the Balkan Peninsula, there is a much longer continuity of migrations initiated by the

industrialization of this area. Especially since the sixties of the 20th century there have been both extensive and less extensive migrations of young and working age population from the mountainous areas into lowland areas, or more precisely into towns and cities. Due to its favorable traffic and geographical position and functions, settlements in valleys and ravines of lowland parts of the Balkan Peninsula still present the areas with more intense socio-economic and functional transformation, while settlements in the mountainous part almost always have the most unfavorable demographic features and present a relatively homogenous agrarian region.

This process was intensified in the seventies and eighties of the 20th century, while from the nineties there have been migrations from urban settlements – to the city - the capital city or the gravitational center of the country. Typical examples of this are Athens, where the third of the population of Greece lives or major cities of the former Yugoslav republics that attract people from all parts of the country intensively, regardless of whether they are villages, towns or cities. What is common to all countries of the Balkan Peninsula is the consequence of these migrations - rural depopulation, especially in mountainous areas.

Unlike mass migration of dominant population in some countries of the Balkan Peninsula, small ethnic groups still continue to isolate and separate, as the examples of Torbeshi, Pomaks and Goranci show. Cvijić (1922) pointed out that “returning to the patriarchal conditions, they created their own civilization...”.

CONCLUSION

Current conditions and importance of the processes of mergers and divisions of peoples on the Balkan Peninsula have not diminished since the time of Cvijić. Even in the 21st century, the Balkan Peninsula is often regarded in Western scientific and political circles as the scene where civilizations clash. This region has long been known as the zone of conflicts in which ethnic relations and cultural identities alternated. Hence the ambivalence in regard to the Balkans exists - from the bridge, the cradle and umbilical cord of Europe, to the unknown world, the damned yard and the powder keg (Stojanović, 1995). The strategic position of the Balkan Peninsula, composed by natural resources (ores, waters, forests, soils) has always caused the region to be in the sphere of interests of great powers. Cvijić pointed out that the fragmentation of the relief was the cause of regional ethnographic diversity which can be seen within a single Balkan nation, no matter which it is.

The peoples of the Balkan Peninsula that were for several centuries under the Ottoman, Austro-Hungarian and Venetian rule, after disintegration of the empires created their own national states with differentiated ethnically motivated divisions. From these political and historical conditions centuries long intolerance and hostility between some of the Balkan peoples arose, and throughout their history they mostly waged wars against each other. Modern history indicates that during the 20th century there were many wars on the Balkan Peninsula. World War I started there, two Balkan Wars were fought and at the end of the 20th century regional wars and civil wars within some of the republics of former Yugoslavia were fought.

Contemporary global processes, which caused modernization of the world in the 20th century, did not avoid the Balkan Peninsula, changing its economic and political landscape. Economic development of the Balkan states had little impact on the change of their peoples, because they are prone to divisions and are still burdened by the past in the first decades of the 21st century (Lovčanski, 2005). Even though the Balkan nations are closely linked by multiple historical ties and are directed at each other by their geographic locations and natural resources, economic and cultural ties between them are still weak because the mentality of the population changes slowly. The Balkan states are plagued by numerous common challenges (restricted national markets, economic underdevelopment, high unemployment, corruption, regional polarization and mass influx of population in urban agglomerations, poverty, increasing unemployment), so the interstate cooperation often stays in the background. There are numerous reasons for the absence or poor cooperation between the Balkan states: the non-existence of traditional multilateral cooperation, economic underdevelopment, a number of unresolved issues from the past such as the position and the right of ethnic minorities and the unresolved issue of the return of refugees to their ancestral homes, as well as striking differences among the Balkan countries in terms of political, economic, national and other interests.

The peripheral position of the Balkans in relation to the main integrations in Europe also contributed to the inertia of the Balkan states with regard to any kind of cooperation. In order to overcome the problems of the past and increase economic cooperation it is of great importance that the countries of the Balkan Peninsula strengthen their democratic potential, cooperate in resolving open issues and thus improve security in the Balkans (Šabić et al., 2010).

The countries of the Balkan Peninsula enter intergrations independently or under pressure from major powers, whose interests continue

to intersect in this part of Europe. Regional cooperation and integrations of the Balkan states should enable faster solving of political and economic problems (Algieri, 2004). This is the way to make this part of Europe a region of mutual trust, cooperation, stability and above all a region of mergers and permeation.

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ETHNICITY ON THE PAPER: ETHNOGRAPHIC MAPPING ON THE ITALIAN-YUGOSLAV BORDER

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ABSTRACT: Following the armistices of the First and the Second World Wars, the allied powers met in Paris twice, first in 1919 and then in 1946 to establish a new geopolitical order of Europe. In the reterritorialization of the Upper Adriatic, the borders should have been mainly based on ethnic criteria and only marginally according to economic or strategic needs. The aim of this paper is to present some significant examples of ethnic maps of the areas straddling the border between Italy and Yugoslavia compiled at that time. These maps should translate onto the page the idea of the borders drawn on "principle of nation" criteria, a search for the elusive equilibrium between a natural border and a human one, or rather between an area in which to exercise one's sovereignty and an area in which one can identify one's own nationality. This brief list of ethnographic maps shows how, during the first half of the XX century, cartography with his rich toolbox of techniques played an important role both in the diplomatic context, as geopolitical problem-solving devices, and also in that of public opinion, as medium of communication for local propaganda and consensus making.

Key words: maps, ethnicity, border, Venezia Giulia, Yugoslavia

INTRODUCTION

The cartographic representation of the population living in the Upper Adriatic territories, based on ethnic-linguistic characteristics appeared during the XIX century as a consequence of the diffusion of national movements that were fostering the formation of independent national States.

The large multinational Empires were the first to be interested in knowing how to control the ethnic composition of their citizens; censuses served the scope, while also offering a number of other useful information about population.

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At the end of the XIX century, surveying techniques became progressively more precise and accurate; for example, there was a shift from asking which was the mother tongue to asking the language mainly used. However, there were still sources of uncertainty and biases; in fact old censuses did not offer the option to not answer, or to deny any of the option proposed; furthermore most of the population was illiterate, thus favouring surveyors' discretion. Finally, also the cartographic representation of the collected data was sometime arguable, since it was shaped in order to serve a specific scope (Irsml FVG, 1996, 65–68).

The Habsburg started ethnic surveys between 1846 and 1853; they achieved statistically valid and significant results; since 1880 a census was done every 10 years, but after 1910 the reference censuses for the upper Adriatic are the Italian censuses of 1921, 1931 and 1936. After WWII the Italian Republic ceased to survey linguistic differences, while ethnic censuses were carried on in Yugoslavia until its breakdown.

In this paper I will present some of the most significant ethnographic maps drafted by local experts from the early 1900s to the end of the Second World War, a period of several changes in the layout of the Adriatic borders. Through specific symbolism and iconography, the attempt was to offer a simplified version of the complex human mosaic of the territories forming the Venezia Giulia. It will be examined and compared the different techniques of representation to see how these maps were used for different purpose, sometimes just as iconic medium for political propaganda, or in other instances as a result of acquisition of geographical knowledge to argue possible changes in political boundaries.

THE USE OF ETHNIC MAPS TO DEFINE THE ITALIAN-YUGOSLAV BORDER

The outbreak of the First World War saw the rise of Italian irredentist demands; this contributed, beside the principle of ethno-linguistic limit, to the emergence of the need for a "secure and stable border" corresponding to the "natural extension" of the Italian nation (Valussi, 1972). For this reason in almost all maps appeared the attempt to identify and to outline a "natural border" of Italy, in order to strengthen, on a scientific grounds, future territorial claims.

In November 1918, at the end of the First World War, the Habsburg Monarchy ceased to exist and replaced by new States, such as Hungary and the Kingdom of Serbia, Croatia, and Slovenia - Kraljevina Srba, Hrvata i

Slovenaca (or shortened into S.H.S.). According to diplomatic negotiations within the Treaty of London (1915), Italy should have been rewarded with large territorial acquisitions in Trentino, Venezia Giulia and Dalmatia; this clashed with the position taken by U.S. President Thomas Woodrow Wilson, who refused to recognize any secret agreement between individual Countries without acknowledging the other co-belligerents. The disagreement emerged in particular in regard of the boundaries on the Adriatic, which was disputed by the Kingdom of Italy and the new Balkan state of S.H.S.

President Wilson conceived the new structure of Italian and European borders outside the old imperial pattern of the great European powers, and postulated the adoption of criteria based on the "principle of nation". To this end, he instituted a commission of U.S. experts, called Peace Inquiry Bureau, to develop a boundary line mainly according to ethnic criteria and only marginally according to economic or strategic needs. The U.S. proposal (although it was later slightly modified) is commonly known as the "Wilson line" (27th October 1919). According to the Wilson line Italy should have obtained large part of the Earl of Gorizia, Trieste with the districts of Sežana and Comeno, almost the whole Istria (including the mining town of Albona which was previously excluded). The Balkan Kingdom should have acquired western Carniola, the Liburnica coast, Rijeka and Dalmatia. But no agreement was reached; the proposal was not favourably received, the Italian delegation was extremely hostile, in fact, as a form of protest, Italy left for a short time the work of the Peace Conference (Belci, 1996; Crampton, 2006).

Quite difficult was the agreement between the Kingdom of Italy and the Kingdom S.H.S. which was concluded only after a year of protracted negotiations with the Treaty of Rapallo (11th December 1920). Italy renounced to the annexation of the former Austrian Dalmatia (with the exception of Zadar), but obtained all the other territories as established with the Treaty of London, such as the whole Austrian coast including Istria, and part of the territory of Carniola (more precisely Postojna and Longatico).

An issue particularly complex regards the city of Fiume (Rijeka), which was once a Hungarian village and was already claimed by Italy many times (although not included in the Treaty of London). The city was occupied arbitrarily by Gabriele D'Annunzio on the 12th September 1919, at the command of a composite and diverse group of former militaries and irredentists. However, after the agreements of Rapallo the occupants were removed by the Italian army (31st December 1920) because the Free State of Rijeka was instituted. The latter included most of the autonomous Hungarian communities; it also included a narrow coastal strip that stretched

to the Italian border. Few years later, there was another significant change in the layout of the Adriatic borders, the territory of Fiume was annexed to Italy under the Agreement of Rome (27th January 1924) between the Kingdom of Italy and the Kingdom of S.H.S.

A document that reproduce the irredentist climate at that time, it is certainly the *La Regione Veneta e le Alpi Nostre...* [*The Veneto Region and the Our Alps...*].

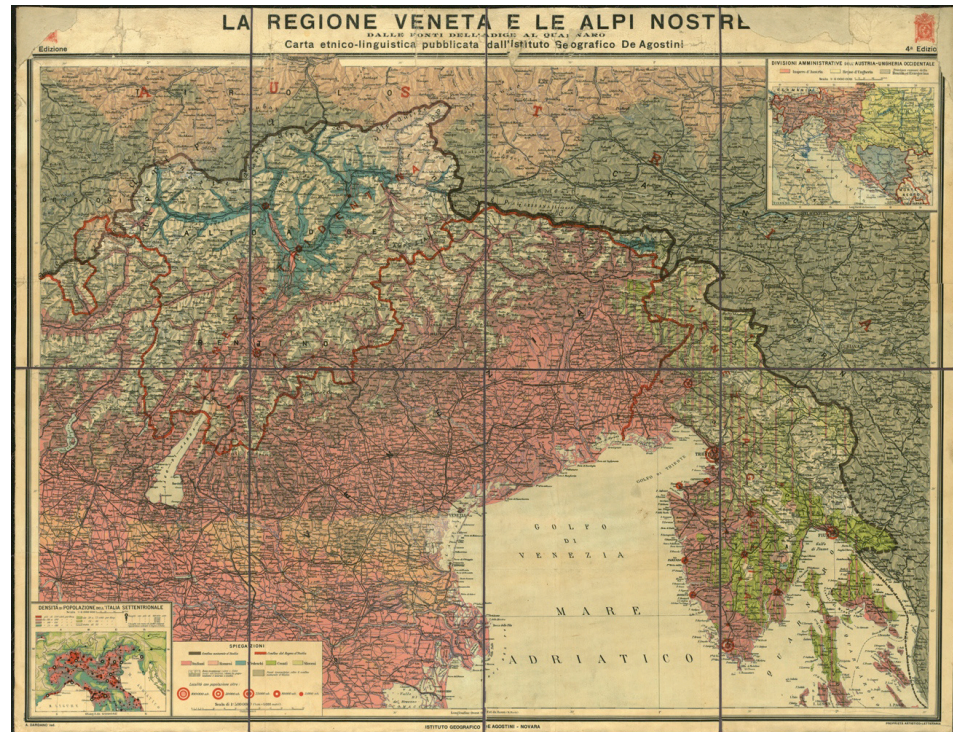


Fig. 1. *La regione veneta e le alpi nostre dalle fonti dell'adige al quarnaro* [*The Veneto Region and the Our Alps from the Sources of Adige to Kvarner*], Achille Dardano, Istituto Geografico De Agostini Novara, 1915

It is an ethno-linguistic map (Fig. 1), created at a scale of 1:500,000 by Achille Dardano that depicts the Veneto region, Tridentine Venice, Venezia Giulia and the Austrian territories to the north and east of the Alpine arc between Graubünden and Carniola. As well as presenting a detailed geographical picture of the area's physical-natural elements, the map also outlines the political border of 1915 in red, and the attempt to identify a "natural border" to the Kingdom of Italy, along the Julian Alps, which is depicted in brown.

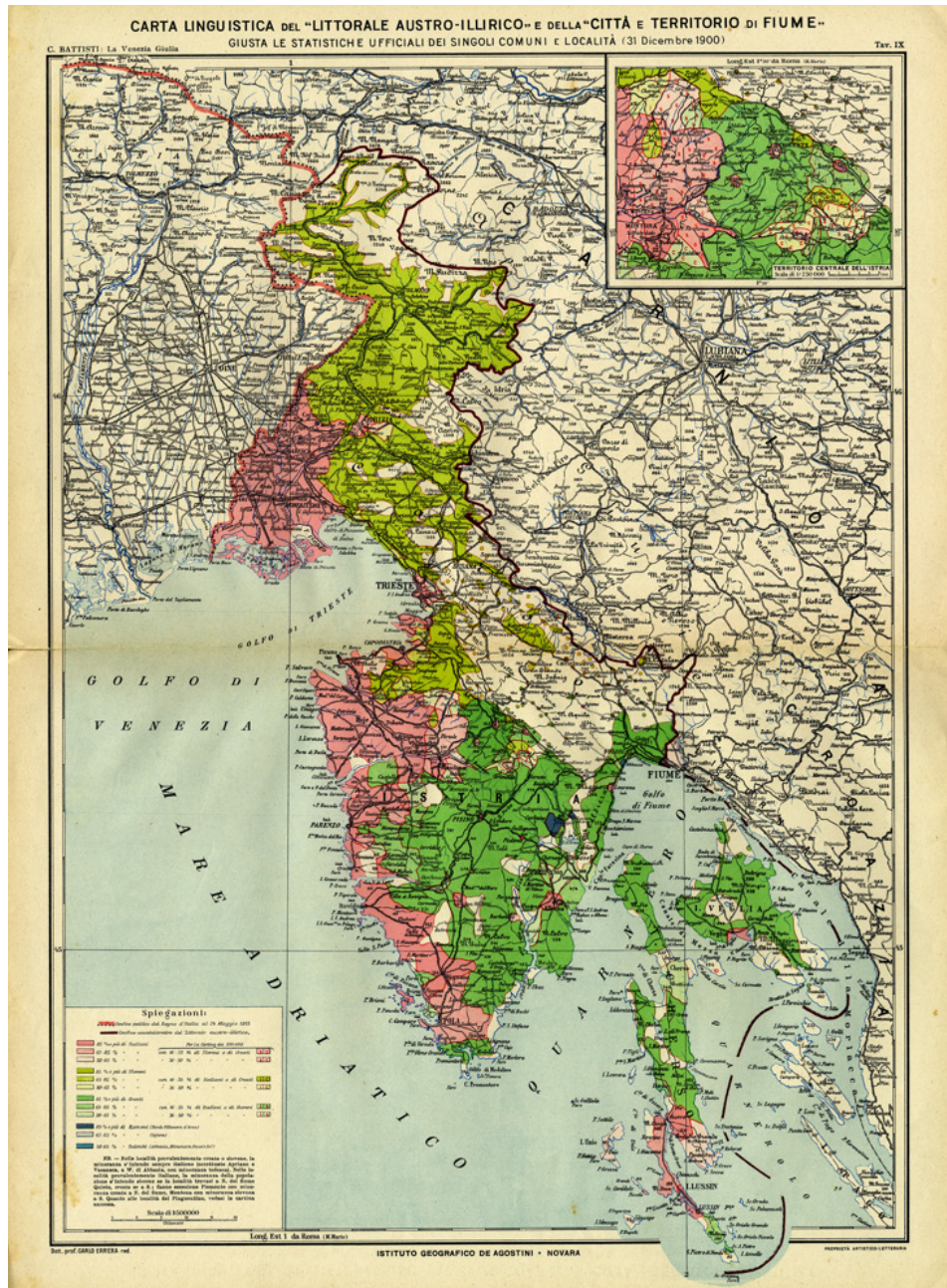


Fig. 2. Carta Linguistica del "Littorale Austro-Illyrico" e della citta' e del Territorio di Fiume, [Linguistic Map of the "Austro-Illyrian Coast" and the City and the Territory of Rijeka], Carlo Errera, Istituto Geografico De Agostini Novara, 1920

The linguistic mosaic which distinguishes the territories during the “irredentist” era of Venezia Tridentina and Venezia Giulia is particularly noteworthy and looking more closely is possible to note some interesting peculiarities. The western coast of the Istrian peninsula is dominated by an Italian population, featuring some isolated Slavic zones; while an opposite situation characterizes inland areas and the eastern coast; in fact, here the Slavic population predominates, and there are only few “ethnic pockets” of Italians. It is interesting to observe how north of Trieste, the coast is almost entirely characterised by Slovenian settlements, even though the shoreline seems to have coloration attributable to the Italian component. Furthermore, near Lake Čepić, and on the slopes of the Čičarija Mountains approaching Zejane, communities of Istro-Romanians, (the so-called “Cici”) are identified. In the Karst hinterland, the map displays a mixture of Slavic and Italian populations, with a predominance of the former rather than the latter. The same holds for the area named Slavic Veneto. The only German-speaking areas are identified as being along the Val Canale, in the Sappada basin, in Sauris and near Timau.

Two small frames are added to the Legend, one detailing population densities, the other outlining the administrative divisions between Austria, the Hungarian Kingdom and the Condominium of Bosnia and Herzegovina, which had been annexed to the Habsburg in 1909 (Adami, 1930, 15–18).

Finally, it is important to note the technique of representation used: territories in which a given ethnic group represent the whole or the absolute majority, are coloured with the same shade. The result of this is the loss of a large degree of statistical detail regarding populations and minorities (such as their number, distribution, density etc.). Due to the shortcomings of the aforementioned representation technique, the map offers a wide and simplified depiction of the area, which is ultimately poor in terms of detail (Selva & Umek, 2013, 150).

Some years later, the same cartographical model will be used by Cesare Battisti for his informative atlas *La Venezia Giulia. Cenni geografico-statistici* as Tav. IX - CARTA LINGUISTICA DEL “LITTORALE AUSTRO-ILLIRICO”... [*Linguistic Map of the “Austro-Illyrian Coast”...*], edited in 1920 by the Istituto Geografico De Agostini in Novara. Even here the statistics of the 1900 census are apportioned into the five ethnic groups present in this territory, Italians, Slovenes, Croats, Romanians and Germans, as well as the representation technique remains the same (Fig. 2).

During World War II, the boundaries between warring States varied continuously and the territories of the Northern Adriatic were subjected

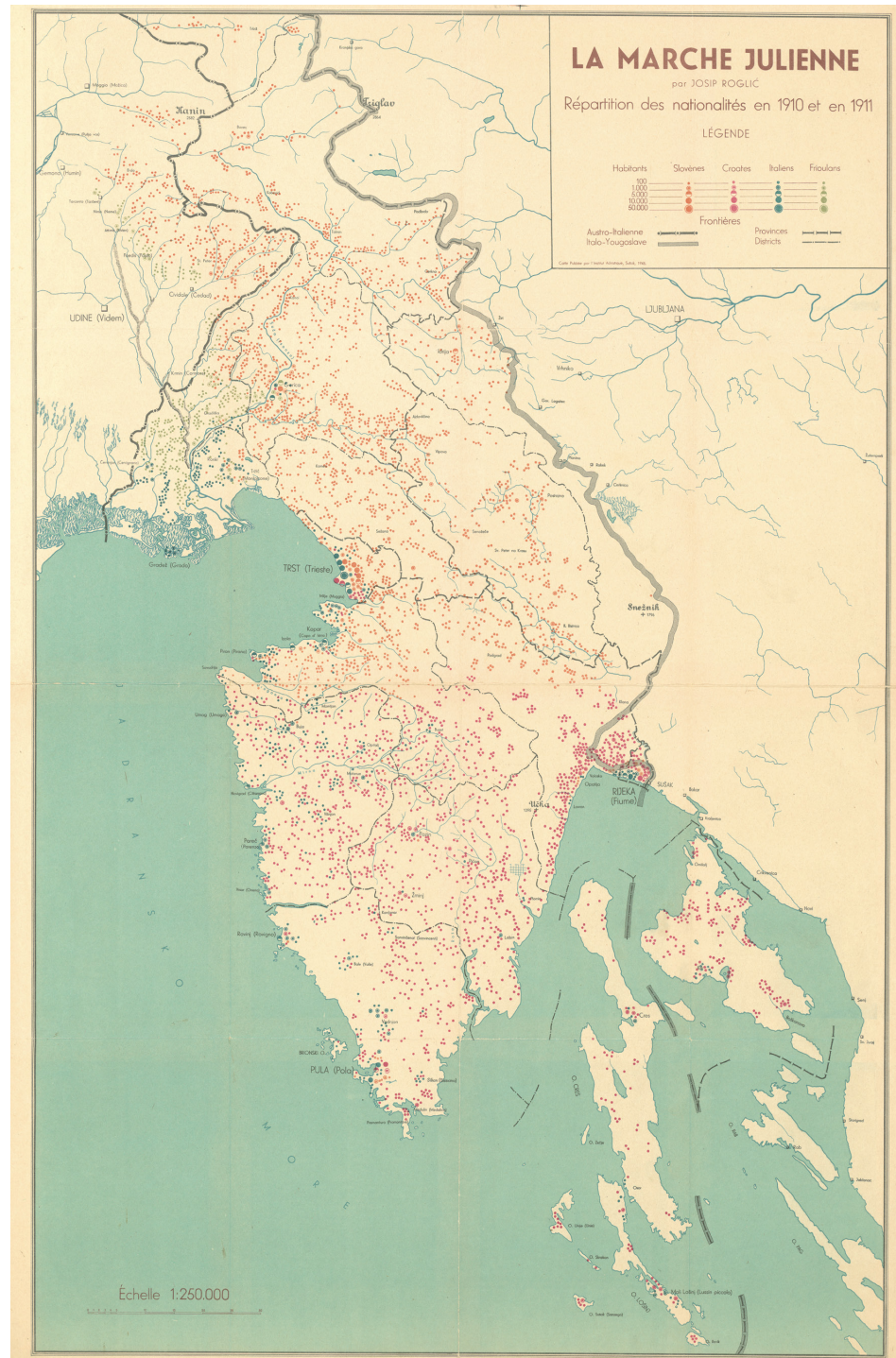
to several changes and as it is well known, even after the Second World War the issue of borders in this area was again object of great controversy between the States. The Peace of Paris was signed on the 10th of February 1947; it established the borders between the Italian Republic, the Socialist Federal Republic of Yugoslavia, and the Republic of Austria. Many propositions were presented by the different diplomatic delegations. The most penalizing for Italy were the ones supported by Yugoslavia and the Soviet Union, because they included the loss of Trieste, Gorizia, Tarvisio, Cividale, Grado and the whole Istria. The least severe for Italy were the ones presented by the UK and the U.S.; according to which, the border should have followed in the north the line that divided the province of Udine from the Austrian coast until 1914, and in the south Trieste, Gorizia, Gradisca and the western part of Istria from Koper to Pula were left to Italy, while Rijeka and Pisino should have been given to Yugoslavia. The French proposal agreed in the northern part with the Allies' proposition, but reduced the Istrian territory to be given to Italy, which included only Cittanova and the territory up to the Quieto river. The Italian Government proposed a line that referred to the second proposal of the U.S. President Wilson in 1919, opting for the loss of Rijeka and Zadar. No changes were made to the border between Italy and Austria.

During these negotiations, the different delegations presented a large number of documents to support their arguments and positions, many of which in form of maps, and with particular attention to those dedicated to the ethnographic situation.

From this series, the first document brought to the attention is a Yugoslav map, the *LA MARCHE JULIENNE [The Giulia Mark]* by Josip Roglić. This ethnographical map was published in 1945 by the Institut Adriatique of Sušak and then attached to a text written by the map's author, which was entitled: *Le recensement de 1910. Ses méthodes et son application dans la Marche Julienne*. This study, which was expanded for the Peace Conference of 1946, criticized the surveying methodology adopted in the Austrian and Italian censuses. The Croatian geographer developed two ethnic maps of the entire Venezia Giulia area, based on statistical and historical studies of various Yugoslavian authors. The Council of Foreign Ministers did not recognize this publication as an official document.

This ethnographical map of Venezia Giulia uses coloured dots, whose area is proportional to the size of the population of the inhabited areas. Compared to Schiffrer's work (see Fig. 5), this map offers a more precise distinction between the two general groups previously considered (the Italian and Slavic populations). Indeed, each group was divided in two,

Fig. 3. *La Marche Julienne* [The Giulia Mark], Josip Roglić, Sušak, 1945



with the map thus indicating four distinct ethnic groups: the Slovenian, Croatian, Italian and inhabitants of Friuli.

The technical method of representation adopted by Roglič consists in the use of conventional signs (dots) of different colours and different sizes to indicate the ethnic composition of individuals for each populated place. The most important cities were thus identified with a cluster of dots, grouped perhaps in neighbourhoods or villages (as can be seen, for example, in Trieste) with different colours according to the corresponding ethnic group. This method allows the dots to convey both the ethnic relations and the number of inhabitants in absolute terms. It is evident that this system does not require an elaboration of the available figures: all that is required is to transpose the numerical statistics into conventional symbols. However, it is possible to speculate that the author may have simplified the figures for the smaller populated areas, choosing to depict only the ethnic group which constituted the majority.

The greatest merit of this use of symbols is the potential to highlight the presence of minorities, even in large centres such as Trieste, thus avoiding the overshadowing of smaller ethnic groups. By the way, the most striking shortcoming is the loss of detail of the visual contrast between dense (Italian) settlements, and scattered (Slavic) settlements (Umek, 2001, 663–676).

Edited in the same year as the former map, it appears particularly interesting also the sheet intitled in Russian language, ETNOGRAFIČESKAJA KARTA JULIJSKOJ KRAINY, VENECIANSKOJ SLOVENII I PROVINCII ZADAR [Ethnographic Map of Venezia Giulia, Venetian Slovenia and the Province of Zadar] (Fig. 4) anonymous, but included in the work of Lavo Čermelj, *Slavic Minorities in Italy: Slovenians and Croatians in the Giulia Region* (Ljubljana, 1945). This coloured map depicts the territories of Venezia Giulia, Venetian Slovenia, and the province of Zadar. The colours indicate the proportions of Croatians and Slovenians in the different localities into which the territory is divided. This information is conveyed by a cartographical symbol (in this case a square) which illustrates the ethnic proportion in the considered area. The map provides information in two languages: the title and the legend are in Russian, while the names of the cities are in Slovenian. This induces to suppose that the original version was created entirely in Slovenian.

The technique of representation is that of areas in which colours are used to indicate the territory where an ethnic group represents all, or the majority of the inhabitants. This method means that a significant part of the statistics relating to populations and minorities (their number, distri-

bution, density, etc.) is not given, therefore, the resulting cartography can be said approximate and superficial.

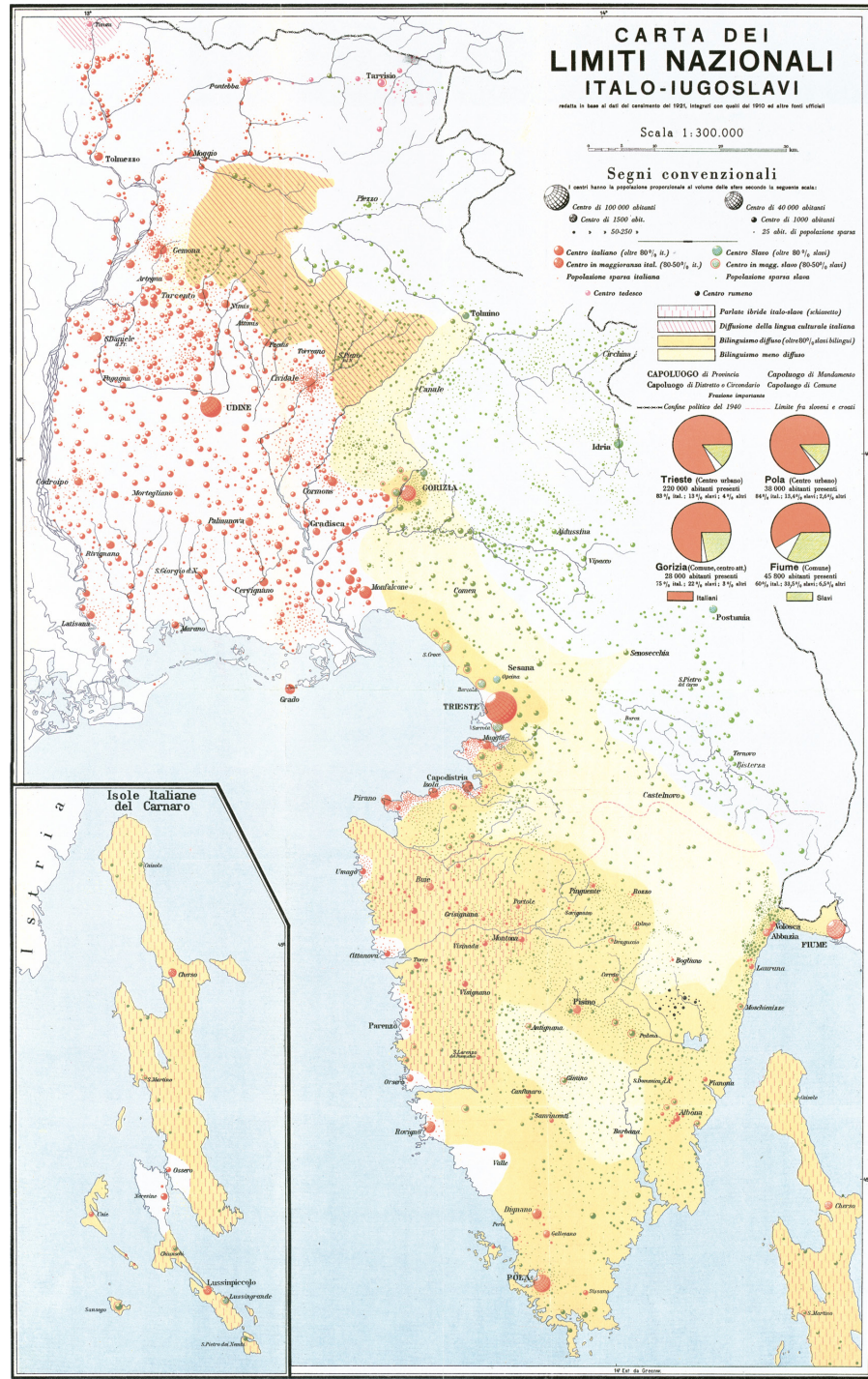
The territory represented is subdivided according to the political-administrative divisions in effect at the end of 1936 (provinces, jurisdictions, municipalities), while the statistical figures are from the official census of 1910. The map also reports a table of the municipalities and their major cities written in Slovenian and accompanied by the Italian translation (Irsml FVG, 1996, p. 73).

Among the best known Italian cartographic documents circulating at the time, it is certainly to highlight the *CARTA DEI LIMITI NAZIONALI ITALO - IUGOSLAVI* [Map of the Italian-Yugoslav National Limits] by Carlo Schiffrer (Fig. 5).

This ethnographic map uses a set of coloured symbols (spheres, disks and dots), in which the area of the symbols is proportional to the population of a given inhabited area. The map depicts the distribution of various ethnic groups in the territories between the Tagliamento river and the eastern Italian border between 1924 and 1941. The map specifically focuses on the respective percentages of the "Slavic" and "Italian" populations over the total population number of people living in a given place. As well as depicting the distribution of ethnic settlements, the map also presents a series of linguistic statistics, such as the diffusion of bilingual Slavs and the areas where the hybrid Italian-Slavic (Schiavetto) was spoken. In describing the methodology used in creating the map, the author underlines how: "having selected the statistics, what remained was to select the system with which I could display the facts on the map: what criteria to follow in order to create an accurate and efficient cartographical work. In general, ethnographical maps follow a system whereby the various nationalities are represented with different hypsometric tints, integrated with other cartographical signs. But this system, which is more statistical than geographical, can prove inconvenient. In Venezia Giulia the distinction between nationalities is often a distinction between dense populations and sparse ones. This circumstance results in the fact that the space inhabited by Italians appears less than that inhabited by Slavs, without, however, the demographic density of the two nationalities correlating with the inhabited area".

The author identified the lack of accuracy inherent to a system with a single coloration. In this case it would identify Istrian cities with the Italian colour, give to the majority of the countryside the Slavic hypsometric tint, and would also neglect to consider population density or the nature of the terrain. Hence, Schiffrer adopted a new technique. Schiffrer's method

Fig. 5 *Carta dei limiti Nazionali Italo-Iugoslavi* [Map of the Italian-Yugoslav National Limits], Carlo Schiffrer, Milano, 1946



consisted of colouring a single conventional sign (in this case a sphere), proportional in size to the population, with the colour of the ethnicity which in a determined centre proved to be the absolute majority. The symbols used differed according to whether the proportion was over 80%; or between 50% and 80%. This method of representation requires the original figures (in this case taken from the censuses of 1910 and 1921) to be processed, in order to render them more simply and easily transferable to the map. The main characteristic of this method of representation is that it provides a clear and detailed indication of population densities, thus making it possible to see the contrast between the sparse nature of the Slavic settlements, and the dense coastal Italian settlements.

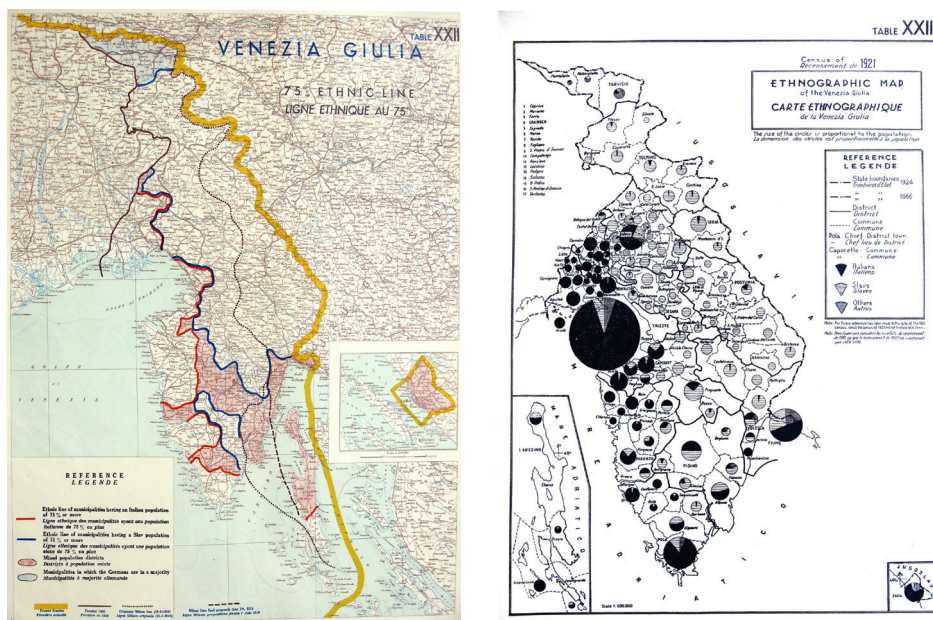


Fig. 6. Table XXII and XXIII from *Venezia Giulia* anonymous, [Roma], [1946 ca.]

In particular it highlighted the latter at the expense of the former. However, a failing of this system is that there is no representation of the minorities who constituted less than 50% of an inhabited area, meaning that these groups effectively lose their entire cartographic importance, this seems to be the main limitation of this map. Carlo Schiffrer, historian and geographer from the city of Trieste, attended the Paris Peace Conference in 1946 as an expert in the Julian delegation. He presented a historic-geographical study at the Conference, which was entitled: *La Venezia Giulia. Saggio di una carta dei limiti nazionali italo-iugoslavi*, which discussed precisely this ethnographical map (Umek, 2001, 663–676; Irsml FVG, 1996, 73).

Amongst the numerous documents presented by the Italian Government at the Paris Peace Conference in September 1946 with the aim of refusing the winners' arguments, these geographical works assume a particular historical significance, since they offer a cartographical representation of the Italian point of view.

They were compiled by a delegation of experts, among which stands out the name of the historian and geographer from Trieste Carlo Schiffrer. These maps and diagrams summarize the substantial Memorandum, which cited historical, geographical, economic and ethical arguments to support the Italian case.

The position of Italy in this period was well known: the Italian government requested a referendum for Venezia Giulia, arguing that this would be the fairest means of establishing a boundary between the nations. Italy's aim was to push for a "fair boundary" which corresponded to the second ethnic line, as proposed by the US President Thomas Woodrow Wilson in 1919 at the Peace Conference of Versailles.

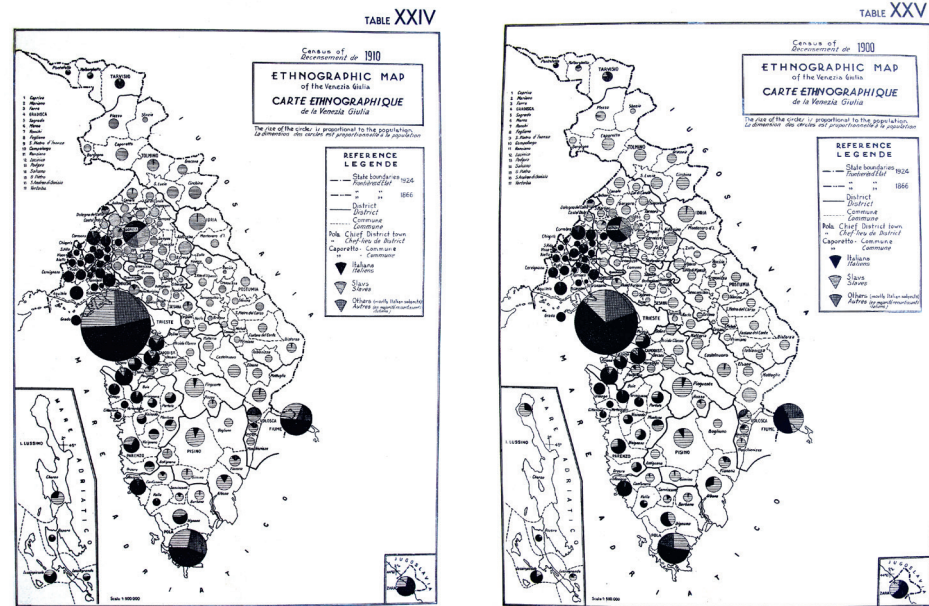


Fig. 7. Tables XXIV and XXV from *Venezia Giulia anonymous*, [Roma], [1946 ca.]

This line responded to the "principles of nationality" which Wilson had proposed as a solution for the "Adriatic Issue", but which had been overruled by Italy's direct treaties with the government of the Kingdom of Serbia Croatia and Slovenia (S.H.S). These treaties had clearly favoured Italy,

which had easily managed to impose its point of view on the weak and dis-united Yugoslavian government, thus obtaining vast Slavic territories and establishing, an “outpost” border to the east.

Italy was comforted by the fact that “Wilson’s Second Line” would have been indubitably accepted by the United States, since it was a diplomatic compromise reached by American experts after WWI. It took into consideration both ethnical and economic criteria. Furthermore, in order to obtain the support of the American delegation, Italy was prepared to abandon its military demands, favouring a more moderate ethnic stance, in the hope of securing a newly-defined border (Valussi, 1972, 188–190).

The maps were collected in a volume entitled *Venezia Giulia*, which was published in English and French. Ordered with roman numerals, the twenty-nine tables were subdivided into five sections, according to the arguments they dealt with. The first presented the political and the territorial subdivisions from 1866 to 1946. The second illustrated the geographical situation in relation to the natural orographic limits of the eastern border of Italy, providing evidence of the areas of strategic military importance in *Venezia Giulia*. Then, followed a large number of thematic tables which had the aim to delineate the economic situation of the region, making reference to the industrial conditions, electricity power plants, mines, forests, transport networks, aqueducts, and tourism. A separate section was reserved for the description of the Adriatic ports and their relations to the hinterland. The collection ended with five ethnic maps which depicted the density and the territorial distribution of Italians and Slavs.

Many of these tables were accompanied with statistical notes, footnotes or diagrams; some of which were printed on transparent paper and could be superimposed on the geographical maps for an immediate comparison.

The territory of *Venezia Giulia* is depicted in its whole at a scale of 1:500,000, onto which the borders in place in 1946, the previous border of 1866, and the two lines proposed by President Wilson in 1919 are always drawn. A frame on the right portrays the city of Zadar and its provincial territory, which after the Treaty of Rapallo (1920) was assigned to the Kingdom of Italy and was presented as an Italian enclave in the Dalmatian coast.

The four map here reproduced (Fig. 6 and 7) are all from the fifth section of the tables dedicated to “The Ethnic Situation”. The first shows the “75% ethnic line” in the area of *Venezia Giulia* in which appear also the eastern “frontiers” of Italy, according to the Treaty of Rapallo in 1920, that one of 1866 and the two border proposals elaborated by the US President, Thomas Woodrow Wilson in 1919. Besides the 75% ethnic line, blue

for Slaves, red for Italians, this map uses a staining with red lines to show the areas in which there was a mixed population, as well as the municipalities of Pontefella, Malborghetto and Tarvisio in which the Germans were the majority are put in evidence. The other three present the distribution of the population by municipalities referred to the first Italian census in 1921 and to the last two Austrian census of 1900 and 1910. However, it must be said that the Italian census has been taken before Fascism and only two and a half years since these territories had been brought under the Italian administration, therefore the map cannot give a real picture of the ethnic changes that have been taken place after more than twenty years of Italian political and economic influence.

All the three examples are depicted in black and white and the technical method of representation consists in the use of conventional signs (circles) where the size of the circles are proportional to the population. Each circle is divided according to the ethnic composition of the corresponding "municipality". There are only three level of distinction: Italians, Slavs and Others.

Despite the fact that, in the present document, no reference is made to the Memorandum or to the Peace Conference, a note inside the cover reads: *A Tribute from the Foreign Minister of Trieste*, 5th April, 1948. It suggests that these materials circulated amongst the departments in Rome and almost certainly formed part of a collection of the official documents presented in Paris. The these materials presented by the Italian delegation were considered amongst the most serious and veritable of all the documents circulating at the Conference; despite the delegation's attempts to promote the discussion to a level beyond the mere rhetoric of political and military possession, the results were certainly not what Italy had hoped for.

CONCLUSIONS

From this brief and certainly not exhaustive review of maps, it seems clear that during the first half of the twentieth century the mapping had assumed a key role in the "genesis of political thought" of these territories and in particular the statistical cartography related to ethnic censuses became geopolitical problem-solving devices in diplomatic contexts. It has been noted, also, how in the course of the century the "art of cartography" had a rich set of techniques for mapping human population distribution, including density, language diversity or ethnic characteristics and was able to produce valuable documents also from the graphic point of view. On other occasions, however, the ethnographical maps served as mediums of

communication for the local political propaganda and to create consensus around the idea of nation that was to be presented to the public opinion.

Unfortunately not always this intellectual effort of human science and the evidence of geographical facts were rewarded by the right consideration in political decisions and often the final choices were determined by factors that cartography was not able to translate on paper.

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JOVAN CVIJIĆ'S YUGOSLAV IDEOLOGY – BETWEEN NATIONAL UTOPIA AND POLITICAL REALISM

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ABSTRACT: In this article the author analyses ideological and political bases of the ideas of national liberation and unification of the Yugoslav peoples, that were promoted in the works of the great Serbian scientist and one of the best known Yugoslav ideologues, Jovan Cvijić. Cvijić based his attitudes on the ethnic closeness of the Yugoslav peoples on his personal beliefs and political views, as well as the official policies of the Serbian government that had, at the beginning of the First World War, officially supported the establishment of the Yugoslav state in the case of Serbian victory against Austria-Hungary. Like the other supporters of the Yugoslav idea, Cvijić was not nationally exclusive, and was viewing nationalism as a positive cultural and traditional force of one nation, and not as an instrument of conflict with others. This "idealism", however, to a certain extent prevented the complete understanding of the complex phenomenon of nationalism that besides constructive and positive also has its dark, destructive side, due to which it finally completely defeated the Yugoslav idea and destroyed the Yugoslav state.

Key words: Jovan Cvijić, Yugoslav idea/ideology, Yugoslav peoples, national identity, nationalism

INTRODUCTION

Political ideas of alliances of the South Slavic peoples, motivated by their ethnic ties and geostrategic needs, had been created in the first half of the 19th century and, in time, had developed into a wide movement for national liberation on the foundation of which The Kingdom of Serbs, Croats and Slovenes was created, in the year 1918 (Čubrilović, 1983). The goal of the revolutionary Yugoslav ideology was to liberate South Slavs from the occupiers' forces, Turkey and Austria-Hungary, and to create the common Yugoslav state. Conceptions and program of the unification were determined by

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ideological viewpoints of their carriers, who were linking unification with the resolution of the position of Yugoslav peoples, after the centuries of occupations of Turkey and Austria-Hungary. These different attitudes and programs, besides the desire for liberation, were also linked by the awareness of ethnic closeness, which differentiated Slavic from non-Slavic peoples.

One of the most influential and best known Yugoslav ideologues was Jovan Cvijić, the great Serbian scientist and a university professor. Cvijić based his ideological viewpoints both on his personal beliefs and political views, as well as the official policy of the Serbian government that, at the beginning of the First World War, officially supported the creation of the Yugoslav state. Same as other supporters of the Yugoslav ideology, Cvijić was not nationally exclusive. On the contrary, he viewed nationalism as a positive cultural and traditional force of one national group, which was not to be used as an instrument of conflict with other nations. This idealistic view, however, prevented him to thoroughly understand the complex phenomenon of nationalism, the force that finally led to the complete defeat of the Yugoslav idea and the destruction of the Yugoslav state.

POLITICAL AND IDEOLOGICAL BASES OF THE YUGOSLAV IDEOLOGY

The Yugoslav idea differed greatly from the individual national ideologies of the peoples who were supposed to become parts of a future common state. Namely, it was not based on a historical or mythical ideal of the old Yugoslav state. It was not renewed and kept by one language, shared customs and traditions, and common faith. The Yugoslav idea had newer origins and was mostly worked on by politicians and intellectuals. In the period of Annexation crisis and Balkan wars (when it was on the greatest rise) Yugoslavism was most popular among the few intellectuals, while it received more massive support from high school and university students which, in the sea of people, only represented a hopeless small island (Đorđević, 1994). As Života Đorđević (1994) points out, "although it was, both in the Yugoslav monarchy and the Yugoslav republic, widely and gladly talked about centuries old aspiration for unification, there is no serious evidence that the Yugoslav idea had any significant influence on the Serbian, Croat or Slovene peasantry before the First World War. Especially, it cannot be told that it had come from the peasant masses, from which the biggest parts of each one of these nations consisted of" (p. 274).

The Yugoslav ideology, from the beginning of the 19th century, to the outbreak of the First World War did not manage to develop into a single

coherent political and social-national movement. On the contrary, the ideas that this movement consisted of ranged from the request for cultural renewal and autonomy within Austria-Hungary, to a number of different concepts of a common state with Belgrade or Zagreb as capitals, as well as Pan-Slavic movements. Different ideas of unification were intrinsically directed by the national affiliation and political orientation of their supporters who were that way trying to establish the political position of their peoples. The supporters of Yugoslavism, in accordance with their national affiliation, had different motives for unification: "For Serbs the unification of the *Yugoslav region* was a possibility to gather within a parent state, because almost half of Serbs had lived scattered around neighboring empires – Habsburg and Turkish. What was also of great importance was the fact that the unification also meant the creation of a bigger and stronger state, that would be more capable to resist constant attempts of invasion in the Balkans. For the *Yugoslav peoples* in Austria-Hungary, after the centuries of foreign rule, a common Slavic state would provide greater guaranties for survival since they would find themselves surrounded by the other peoples of similar or same ethnic background, and similar or same language" (Trgovčević, 2001, 257).

Most Yugoslav oriented historians emphasized ethnic and cultural bases of the Yugoslav idea, that is mutual ethnic closeness of the Yugoslav peoples which separated them, as Slavic peoples, from non-Slavs (Čubrilović, 1983). The goal of the Yugoslav idea was the creation of a wide (supra)national community in which similarities should have been highlighted and insisted on, and differences respected. According to the words of Ljubinka Trgovčević (2001), this idea was modern because "by assuming that there was one nation or one nation with three names, it equated all the inhabitants of that region, gathering them together under one name and envisaging equal rights for all of them, in accordance with French norms. By doing this, it, on the level of principles, put these peoples in the same line: they are all considered to be state-building nations. Therefore, this can be interpreted as an upgrade of the existing divisions, language and religious differences, because there is an attempt to reduce and bridge them, by including them in a wider frame, and, on the contrary, to highlight similarities that link those peoples. Croats, Slovenes and Serbs together had been seen as an ethnic core from which these peoples emerged, gathered together by the shared Slavic origins, language customs and traditions, from which, in time, a separate nation could emerge" (p. 259).

The idea of national liberation and unification of the Yugoslav peoples was based on different idealistic, liberal-democratic, revolutionary,

progressive, and enlightened visions. The close connection between the Yugoslav idea and “progressive” ideas has origins in the primordial ties of Yugoslavism and enlightenment. These influences enabled the perception of the common characteristics of South Slavs, but they also, at the same time, marginalized those characteristics that objectively separated those peoples, but that also signified their main ethnic, national and cultural traits. Cognitive limitations of enlightenment were great because it could not understand the importance of tradition, history and collective memory. It lacked “wisdom”, because its approach was often ahistorical and unreal. While both Croatian and Serbian nationalism were excessively linked to the past, enlightenment and Yugoslavism were only looking to the future, neglecting the role of tradition and historical memory. Croatian and Serbian national consciousness were mostly based exactly on things that enlightenment was not able to perceive (Đilas, 1990).

The creators of the Yugoslav idea, enthralled with revolutionary spirit and unballasted with national exclusivity, therefore, showed certain naivety, but also a lack of understanding of the phenomena crucial to the functioning and survival of the majority of modern states – national identity and nationalism. National identity, regardless of the different conditions of social-historical development, cultural and other particularities, still represents the most dominant kind of identity in a modern world. Within most nations their members channel their loyalty towards their national group, so that national interests, in most cases, come ahead of and beyond all other state interests. Besides identity, one of the most important modern social phenomena that originates from the concept of nation is the ideology of nationalism without which national communities would not have their political consciousness nor the means of acting, that is, in other words, without which nations would deteriorate to the level of ethnic groups. Nationalism represents a complex political and social phenomenon, a powerful combination of ideology, feeling and principle, which rises above political and state borders in its intention to protect a group cultural identity and secure the survival of its key component – a nation. The power of nationalism to a large extent stems from the fact that this ideology provides the members of a certain nation with historical heroes, myths of origins, visions of unity and security of identity; it, therefore, fulfills one of the most basic human needs – a need for security.

Yugoslavism was never able to be national ideology, in the sense of national consciousness, but it actually was, first and foremost, political doctrine of unclear and changing content and uncertain consequences, from the very beginning. The final goal of this movement – the Yugoslav state,

was envisaged as an “ideal” community of mutually similar peoples who, in that kind of community, would be able to build a shared future by respecting particular cultural traits of each other. The whole idea was loosely based on the possibility of the creation of *hybrid nations* encouraged by the formation and existence of a certain state community (Trgovčević, 2001).

THE YUGOSLAV IDEOLOGY IN THE WORK OF JOVAN CVIJIĆ

The historical misfortune of Serbian people to be divided between huge empires of Austria-Hungary and Turkey, made the question of the Serbian unification very complex. Because of the territorial distribution and the mix with other ethnic groups, the solution of the Serbian national question was linked to the relations between great powers, and the creation of the Yugoslav state seemed inevitable to some. Although Serbian statesmen and ideologues had started to contemplate the idea of solving the Serbian national question through the creation of the wider Yugoslav state as early as the first half of the 19th century, those plans had never been elaborated thoroughly and the Serbian government formulated the idea of the unification of all south Slavic nations only at the beginning of the First World War. During the session of the national assembly, on the December 7, 1914 in Niš, delegates adopted the declaration which stated that the main war goal of Serbia was the Yugoslav unification. This document will go down in history under the name of *Niška deklaracija (Niš declaration)*, and would represent the first concrete step in the realization of the idea of unification. The statement was read by Nikola Pašić: *“The Serbian government will put all of its forces in the service of the great thing and the Serbian state and Serbo-Croat and Slovene tribe. The government considers this to be its most important and, in these fateful moments, only task, to provide a successful completion of this great warfare, which also became the battle for liberation and unification of all our chained brothers Serbs, Croats and Slovenes”* (Nikolić, Žutić, Pavlović & Špadijer, 2002, 151–152).

As Andrej Mitrović (2000) points out, “it shows that already in August there was a firm commitment to create a war goal on the Yugoslav idea, so, in that sense, throughout the second half of 1914 there were efforts to compensate for the gap that had been created because the imposed armed conflict had found Serbia without the needed political and program bases... A wide circle of politicians, diplomats and university professors were searching for the exact geographical area of the ethnic Yugoslav territory and a solution for the political system of the new state” (p. 60-61).

After the official decision of the Serbian government to support the establishment of the Yugoslav state, an ideological need for the elaboration of the Yugoslav idea arose. As it was already stated, since the very beginning the Yugoslav ideology was followed by a certain understatement, confusion and incoherence. There were many ideological and political differences among the supporters of the Yugoslav idea, but there was also a need, especially among the intellectuals, to create a “national platform” of the Yugoslav idea. Namely, for this idea to materialize it needed “the evidence” of ethnic closeness of the South Slavic peoples, primarily Serbs and Croats, who were supposed to create the core of the future common state. The mission of shaping the Yugoslav ideology, which was to lay the foundation for the political program of the Serbian government, was undertaken by the professor Jovan Cvijić, one of the closest government allies in that period. Cvijić set the ideological bases of the Yugoslav program in his famous work *“Balkan Peninsula”*, which represents “a versatile study in which one geographical area had been scientifically researched by including its important natural-geographical and social-historical components” (Mitrović, 2000, 124). Cvijić did not build his scientific synthesis only on the bases of his previous research results and his overall scientific and research experience, but also brought into it his political and ideological beliefs. According to his opinion (Mitrović, 2000): “Until the great metanastasic movements Serbs and Croats had hardly new each other, Serbs and Slovenes even less. Due to the migrations during the Turkish period Serbs mixed with Croats to a great extent. (...) Our national unity is not only based on the primordial kinship of our tribes; it is not only based, besides that, exclusively on the Serbo-Croat literary language and somewhat on the common literature, as is usually thought. What had preceded a common literary language was a long period of ethnic and ethnic-biological equalization and amalgamation in the Turkish and Venetian periods. And because of that our national unity has deeper bases, real national bases” (p. 124).

Similarly to Vuk Karadžić and other proponents of the Yugoslav unification, Jovan Cvijić emphasized the similarity of languages as the main evidence of the ethnic unity of South Slavs. According to his words (Cvijić, 1966), “since long ago investigators noticed common basic ethnic traits of Serbo-Croats, Slovenes and Bulgarians. They stated that the languages spoken from Ljubljana to Salonika and from Izonc to the Black sea differ only slightly. Slavic linguists were the first to group these peoples under the name of South Slavs, contrary to East and West Slavs” (p. 353). Cvijić (1966) notices that there are “still some language and ethnic differences among the different South Slavic groups. The slightest one is between West and East South Slavs, between Serbo-Croats and Slovenes on one,

and Bulgarians on the other side. Serbo-Croats speak the languages that are so identical, that a Croat from Istria can easily understand a Serb from Serbia" (p. 353). According to the author (Cvijić, 1966), besides the language what is also noticeable are the similarities of the customs of South Slavs, that cannot be described by the historical heritage of these peoples starting from their arrival to the Balkans, which leads to the conclusion that these customs actually point out to the shared ethnic roots of the South Slavic peoples. Namely, "as languages are the same or very similar, so the basic customs and folk beliefs, those that were not greatly influenced by the later development, also create one part of the shared heritage of South Slavs, although these peoples, on the Peninsula and outside of it, inhabit areas that are very different geographically. These similarities are even more striking considering the fact that the history of these tribes was different, and the development of each of them completely independent... Besides that, social conditions and the ways of ethnic assimilations, by which one nation transforms itself, were different in the East and the West. It is very likely that common characteristics of all these peoples were not developed after they had settled in the Peninsula. They must have been brought in from the previous Carpathian homeland, where South Slavs had probably formed a single ethnic community, even more tight-knit than it is today" (p. 353). In his attempt to, as much as possible, ethnically and politically bring together South Slavic peoples Jovan Cvijić insists on a claim on common personal traits, that is similarities in the social character of Serbs, Croats and Slovenes. According to his opinion (Cvijić, 1966), "besides language, basic psychological traits of Serbs, Croats and Slovenes are also the same. They excel in intellectual and moral sensibility, by which they differentiate between nuances, most often the finest ones; in a great sensitivity and a highly developed sense of sympathy, which lays on the bottom of a national soul of all South Slavs" (p. 354). The author (Cvijić, 1966) correctly notices that listed feeling "often lead up to passions and can, by inner fights, turn into bigotry. Serbo-Croats also excel in a rich imagination, exaltation and enthusiasm, in short, strongly expressed idealism" (p. 354).

In accordance with his political beliefs and the needs of the new Yugoslav state, Cvijić, probably consciously, exaggerated in his claims on the popularity of the Yugoslav idea among the members of different South Slav nations. Similarly to the other Yugoslav ideologues, he wholeheartedly tried to present the Yugoslav idea as a people's ideology and a people's choice, and not as an elitist and political idea which, actually, had never made to reach the hearts and minds of the Slavic masses. Cvijić declared ethnic differences between South Slavs, especially those created

after the conversion of Orthodox population to Catholicism, as a bases of the new national unity, embodied in Yugoslavism. Namely, "Serbs, who make up two thirds of the South Slavic peoples, penetrated by migrations to Croatia and Slavonia, to Dalmatia and south Kranjska. They mixed with Croats, to a certain extent with Slovenes as well. By partially converting to Catholic and Uniate faith, Serbs contributed to the elimination of previous differences so that Serb and Croat populations could become even more alike. Cultural differences between these two groups were considerably reduced" (Cvijić, 1966, 354). The author (Cvijić, 1966) concludes that, due to migrations, Serbs and Croats mixed with each other to such a great extent that it is impossible to separate them, even from a geographical point of view. Migrations and their consequences had been the main cause of a common literature, national and political manifestations that appeared later" (p. 354). Among the main political manifestations of the South Slavic "unity", as Cvijić emphasizes (1966), are the attempts of liberation and unification in the first half of the 20th century: "During the Balkan wars...and also during the First World War, South Slavs were constantly attacking the policies of Austria-Hungary, openly declaring their firm will to unite with the Serbian Kingdom...At the onset of the World War, South Slavic youth rushed form Austria-Hungary, whenever it was possible, to help Serbia in its unequal struggle. Others had left for France or England and established the Yugoslav committee to contribute with other means to the fulfillment of their wishes. Those who had stayed in Austria-Hungary continuously confirmed, disregarding dangers, their desire to create a national state" (p. 354). The author (Cvijić, 1966) concludes his exposition on the Yugoslav unity with a standpoint that will prove to be the most fatal mistake of all of those who believed in the applicability of the Yugoslav idea: "This movement penetrated public masses. It merged with democratic movement. South Slavic unity was finally sealed by common suffering in the World War. It cannot be broken or stopped by artificial decisions. It should be further strengthened and cherished" (p. 354).

Cvijić's views were under the influence of the official policy of the Serbian and future Yugoslavian governments, as well as his personal beliefs and understandings of nationalism. This Yugoslav ideologue was not burdened with national exclusivity and saw nationalism itself in a cultural way, as a positive cultural and traditional force of one nation, and not as a means of settling accounts with others: "In all exposed views on the national work, views that are based only on the law and strength of the people there cannot be a trace of what is called chauvinism. The true national feeling cannot be a feeling of hatred toward other nations, then it cannot be an overestimation of one's own value and right, and underestimation

of qualities and rights of other nations...Adoration, cult, overvaluation of oneself within a nation is as bad as it is with an individual... Chauvinistic aspirations correspond to a demagogy in political life" (Cvijić, 1907, 22). Cvijić's perception of national feelings undoubtedly enabled him to objectively perceive similarities which existed among the South Slavic nations. At the same time, however, this type of "idealism", to a certain extent, prevented the real insight into the obstacles that stood on the path of the Yugoslav unity.

UTOPIA OR REAL POLITICS – CRITIQUE OF THE CVIJIĆ'S YUGOSLAV IDEAS

The Yugoslav ideology of Jovan Cvijić, elaborated in "Balkan Peninsula", as well as the Yugoslav idea generally, laid on two arguments, which were not essentially completely false, but which were, nevertheless, used selectively and overestimated, with the aim of backing the ambitious political project. On one side, insisting on a language as a key proof of the ethnic closeness of South Slavs had a logical background, based on the fact that differences between Serbian and Croatian language were minor, and that there were certainly no linguistic bases to separate these two languages. Language is always one of the key elements of ethnic and national identity, which gave additional strength and driving force to that sort of argument. Some shared customs, ethnic mixture and certain traits of social character, that Jovan Cvijić wrote about, could also represent a bases of some sort of a common identity. The main problem with the whole Yugoslav idea, however, was the fact that it came too late to be perceived as some sort of a (supra)national ideology, and that it did not have the power neither to weaken nor to reconcile already established national identities, primarily those of Serbs and Croats, who had already been, despite their obvious similarities, antagonistic towards each other.

In accordance with his personal beliefs and the official policies of the Serbian government that South Slavs belong in the same state, Jovan Cvijić put the central part of his analysis to the ethnic and cultural closeness of the South Slavic peoples, primarily Serbs and Croats, from whom, after all, the future of Yugoslavia mostly depended on. In that sense, he wrote about the Serbo-Croat people who, as a separate ethnic collectivity, had actually never existed. Cvijić's insistence on Catholic Serbs as a bridge between Serbian and Croatian people thwarted with national feelings of both Serbs and Croats, who were never able to overcome mutual religious differences, which was the reason for the fact that Orthodox peoples who converted to Catholicism, after the emergence of modern Balkan nations,

became a part of the Croatian national community. Cvijić, however, similarly to the other Yugoslav ideologues, greatly underestimated the importance of cultural and religious differences, key for the sense of national identity, as well as the need of Slovenes and Croats, who did not have their national states, for national self-affirmation. He underestimated the power of centrifugal, disintegrating factors, which led to the creation of the new nations in the Balkans, and which also strengthened and deepened interethnic antagonisms. The main problem of the Yugoslav ideology, which was elaborated by Jovan Cvijić, laid exactly in the fact that it enabled the perception of common features of the South Slavic peoples, but it also, to a large extent, marginalized all those characteristics that objectively separated these peoples from one another, and also created their main ethnic, national and cultural characteristics.

In his critique of the Yugoslav idea, "Yugoslav ideology – The truth about Yugoslavism", Jovan Dučić (Dučić, 2001) maintains that the Yugoslav state had to be preceded by Yugoslav people and Yugoslav language: "But Croats were a way to nationally exclusive, and Serbs enriched with their traditions of the great state and an Empire, which once had been the first states in the Balkans; they were intoxicated with new victories which had only happened yesterday and had made them famous in the whole world. And the language they spoke one called Serbian, other Croatian. When we take into account mutual, centuries old, intolerance, religious differences, cultural mentality, than this leveling and amalgamation could have never been imagined as feasible by this unexpected state merging, which was never prepared in any way, and was even unforeseen" (para. 13). Yugoslavism acquired the appearance of an official patriotism of dictatorships, more than it represented the consciousness of enlightened citizenry. More of a political measure and duty, than a national standpoint and belief (Dučić, 2001, para. 13).

The other argument that the Cvijić's advocacy for the Yugoslav idea was based on concerned the shared efforts of South Slavs to liberate and unite. His statements regarding South Slavs in Austria-Hungary who wanted to unite with Serbia, and South Slavic youth who, at the beginning of the First World War, rushed to help Serbia in the battle against the far more powerful Austria-Hungary were only partially truthful. A great number of Slavic inhabitants of what was then Austrian-Hungarian monarchy did take part in the Great War, on the Serbian side, and did wish for a common state with Serbia, but what has to be emphasized is the fact that almost all of them were ethnic Serbs, while the number of Croats and Slovenes fighting in the Serbian army was insignificant. On the other hand, a significant number of Croats were fighting in the First World War on

the side of Austria-Hungary, and there is plenty of historical evidence of their brutality against Serbs, especially on the territories of Croatia and Bosnia and Herzegovina, where there had both lived for centuries. These are the facts that neither Cvijić nor the other, Yugoslav oriented, intellectuals and politicians did not wish to emphasize in the moments of hard struggle for the common state, but these very facts say enough of (the lack of) popularity and acceptance of the Yugoslav idea among the masses of some South Slavic ethnic groups. Brutal interethnic crimes in the period of the Great War which, unfortunately, had only signified the introduction to the ethnically based mass violence in the Second World War, also say a lot about the strength of nationalism that the Yugoslav ideology tried to struggle against.

CONCLUSION

Jovan Cvijić and the other supporters of the Yugoslav idea connected to one another by romantic and revolutionary ideas, which, in the long term, showed to be unreal and unsustainable. Cvijić's Yugoslav ideology was based on the similarities, that undoubtedly existed among South Slavs, but it also marginalized their mutual differences, as well as the fact that national identities, especially ones of the two biggest South Slavic nations, Serbs and Croats, were founded precisely on those differences. Cvijić built into his ideas his own perceptions of nationalism, which were, without any doubt, positive and idealistic, but which only partially corresponded to a reality of nationalism and attitudes of a great number of the supporters of this ideology. Nationalism as a phenomenon is, namely, almost always both positive and negative, constructive and destructive, considering the fact that this ideology is based on both mutual similarities and mutual differences; nations build their cultural uniqueness on the simultaneous perception of similarities within their own communities and differences in relation to the "opposed", that is "enemy" groups. The huge and impressive power of nationalism can be positive and unifying, but also destructive and destabilizing at the same time, depending on the fact from which side it is looked at, and, often conflicting, interests of different national groups, because of the fact that nationalism as a political principle mostly has as its goal the accomplishment of the interests of one nation at the cost of another (Smith, 1991). What stems from this fact is an idea of national exclusivity which universally burdens and destabilizes multiethnic communities. The whole phenomenon of the nation-state is imagined as an exclusive concept, the state of the one particular nation that exists to protect *its* interests, rights and culture. The idea of a nation is bound to the concept of a nation-state. In most cases national communities share the aspiration

and desire to get or keep their own state, while the goal and ideal of every nationalistic movement and ideology is a nation-state, that is a territorial-political unit whose borders correspond or closely correspond to the territorial distribution of a national group (Hylland Eriksen, 1993).

It could be said that “the whole movement for national liberation, framed into the supranational Yugoslav ideology, in some way remained the hostage of the period and historical circumstances in which it had been created; The Yugoslav idea represented and manifested itself more as a defensive mechanism than as a conscious aspiration of the dominant historical factors to build the Yugoslav civilization. The Yugoslav movement was romantic and idealistic, its idea was undoubtedly noble, but its entire existence was conditioned by the existence of the occupation of some great force and the desire to liberate from it. This revolutionary movement was, quite naturally, burdened with the idea of ousting hated occupiers from power and reaching the ideal of freedom in the conditions in which it looked like a distinct and hardly reachable goal. In the region which had been under the governance of different big powers for centuries, this ideal reached monumental proportions and every reflection on the fundamental differences and conflicts among the local populations was secondary in relation to the resistance to the hated Austria-Hungarian and Turkish empires” (Vukočić, 2014, 88).

It should not be forgotten that Jovan Cvijić wrote “Balkan Peninsula” during the time of the Great war, and that the Serbian government publicly announced the first clear articulation of the Yugoslav idea in the parliament in December of 1914. Misfortunate faith of the Yugoslav idea and state were determined exactly by these dates, that is historical circumstances in which they were created. First World War brought the possibility of the final liberation of South Slavs and the creation or renewal of their national states. For some of them, Yugoslav state was an ideal to whom they aspired, for the others it was a transient solution and an instrument used to liberate their countries from the occupying powers. When the goal of liberation was finally achieved, Yugoslav nations did not have a common enemy anymore, and their national consciousness continued to shape through the further deepening of mutual antagonisms, primarily the resistance of the Croatian political elite to the alleged Serbian hegemonism. Ascribing, however, “all Yugoslav problems only to the struggle between different political interests of Yugoslav nations would mean disregarding true forces of nationalism which was, since the times it had been created in the 19th century, one of the most powerful and most influential ideologies on the global political scene. National ideology is never implemented sole-

ly “from the top down”, but it moves both ways; in other words, political elites can influence masses behavior to an extent, but the opposite is also true. In the case of Yugoslavia, the national principle essentially precluded the survival of the state and brought to its final breakdown” (Vukoičić, 2014, 90). The opposition of the elites, however, only reflected interethnic antagonisms which fed on each other, and on which the strength of Yugoslav nations actually depended. In those moments, true supporters of the Yugoslav idea, those who naively believed in the overcoming of ethnic differences, did not stand any chance anymore. – They had nationalists against them, and with nationalists stood the people, majority of whom had never understood or wanted to except the Yugoslav idea.

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JOVAN CVIJIĆ AS A GEOPOLITICIAN

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ABSTRACT: The paper reveals that Jovan Cvijić was not only a political geographer but also a geopolitician, i.e. that his work – when its content and intentions are observed – is not only political-geographical but geopolitical, as well. The author of the paper has come to this conclusion by means of the content analysis method, having applied it to certain texts by Jovan Cvijić, which he had published prior to and during the First World War. Starting from the understanding that geopolitics, among other things, is also applied political geography, the author has demonstrated how the facts established by Cvijić frequently overgrow the political-geographical level, and, apart from theoretical also acquire practical significance, i.e. they become geopolitical in their character. That is particularly noticeable in Cvijić's writings on the (un)favorable geographical and political position of Serbia, its borders and a need for them to change. Besides, the paper provides the definitions of political geography and geopolitics, as well as derives a demarcation line between these two sciences, relying at the same time on the insights of Otto Maull, a German author. Apart from the content analysis method, the comparative, inductive and deductive methods have also been used in the paper.

Key words: political geography, geopolitics, Serbia, the Balkans, borders

INTRODUCTION

In the scientific public, Jovan Cvijić (1865–1927) is, first of all, known as a physical geographer and anthropogeographer. On the other hand, Cvijić's contributions to political geography had for some reason been put aside, and if it had not been for the wars waged on the territory of the former Yugoslavia during the 1990s, they would probably have permanently remained in the shadow of his known works dedicated to geology, anthropogeography and ethnology. Yet, Cvijić was also occupied with political geography,

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namely in two dimensions. The first dimension relates to the conceptual foundation of political geography. At the beginning of XX century, Cvijić gave a series of lectures in general geography with anthropogeography at Higher School, within the framework of which lectures he also gave one of a political-geographical character, dedicated to the phenomenon of the state. In this lecture, Cvijić considers several themes that undoubtedly belong to the domain of political geography, such as the classification of states according to their sizes, their geographical and political positions, and the phenomenon of political borders (Cvijić, 1969). Although not lengthy, this lecture of about thirty-odd pages is very significant for the Serbian geography since it represents the first theoretical political-geographical reading with the Serbs. As far as the second dimension of Cvijić's engagement in the field of political geography is concerned, it first of all refers to several scientific works, in which our scientist discussed Serbia's political-geographical position and the issue of its (un)favorable borders. First of all, it refers to the following works and lectures: *On the National Work* (1907), *The Annexation of Bosnia and Herzegovina, and the Serbian Issue* (1908), *Serbia's Access to the Adriatic Sea* (1912), *The Geographical and Cultural Position of Serbia* (1914).

Although Cvijić undoubtedly was a political geographer, yet having not even been as productive in political geography as he was in, for example, karstology, tectonics or anthropogeography, there is still an answered question of whether he was a geopolitician, too. More briefly, it is the question of whether Cvijić's political-geographical works can also be treated as geopolitical ones. Cvijić was a coeval with the begetting of geopolitics; having unfortunately died at the age of 61, he could not have witnessed its expansion during the 1930s and the 1940s. The term "geopolitics" is known to first have been used by Rudolf Kjellen, a Swedish scientist, as early as in 1899. The term, therefore, had been existing for over two and a half decades prior to Cvijić's death, but had been used very rarely, even by those authors, like Mackinder, who are considered to be the progenitors of geopolitics. Cvijić's political-geographical works were mainly written prior to the First World War, when geopolitics was still in its infancy. No sooner than in the 1930s, which was namely after Cvijić had died, did the term "geopolitics" begin to be used much more frequently, not only in the academic circles but more broadly as well. Although Kjellen's key work "The State as a Living Form" was translated into the Serbian language in 1923, which means that Cvijić had an occasion to become familiar with it, those were the years when our famous scientist was writing less and less due to his being exhausted and his health problems.

Although Cvijić himself did not use the term, nor did he publicly declare himself to be a geopolitician, it does not mean that his works are deprived of a geopolitical content. As we have mentioned above, Mackinder did not use the term, either, which yet did not deprive some of his works, first of all his book "Democratic Ideals and Reality", from being geopolitical in their nature and from being considered as the basic works on geopolitics. In any case, before analyzing the very works by Cvijić from the standpoint of a geopolitical analysis, what political geography and geopolitics actually are should be clarified.

POLITICAL GEOGRAPHY AND GEOPOLITICS

An important feature of political geography is that it is a transitional scientific discipline or science, standing between politicology and geography. In other words, political geography can be treated as both a politicological and a geographical science. It is a politicological science because political phenomena fall within the scope of its research subject. On the other hand, it is also a geographical science because it uses the geographical method and also emphasizes territorial characteristic of those phenomena and their differences from one place to another. Therefore, political geography can be observed as a politicological science using the geographical method and as a geographical science studying political phenomena (Turovsky, 1999). Political geography is also a juvenile science since it was only founded around the end of the 19th century by publishing Friedrich Ratzel's "Politische Geographie". The coexistence of the politicological and geographical dimension in political geography enables it to be defined in different manners, sometimes contradictory to each other. The main point of separation in the definitions of political geography is mainly the one concerning one's understanding of its nature, namely whether it is rather a politicological science or a geographical one. According to Richard Hartshorne, political geography may be defined as the study of areal differences and similarities in political character as an interrelated part of the total complex of areal differences and similarities (Hartshorne, 1964). When speaking about geopolitics, there are also a plethora of definitions. There is no doubt that over time the research subject of geopolitics has been expanded by a lot of new contents, so we can refer to a classical (older and more narrow) understanding of geopolitics and its tasks and a modern (more recent and wider) one. By synthesizing Yves Lacost's, Geoffrey Parker's and Saul Kohen's definitions, Emidio Diodato, a contemporary Italian author, came to a conclusion that geopolitics is the study of the whole of international rela-

tions from a spatial and a geographical perspectives, in which the impact of geographical factors on states' foreign policies and the rivalries of the rule over disputed territories between two or more states or between different political groups and armed movements is discussed (Diodato, 2011). As one can notice, it is a complex definition reflecting the understanding that geopolitics studies a plethora of different political phenomena in their (geo) spatial or territorial dimension.

Prior to the Second World War, during the 1930s, the definitions of geopolitics were somewhat narrower and from the point of view of the content they were simpler. One of the key works dedicated to defining geopolitics and its demarcation from political geography is certainly Otto Maull's work "Das Wesen der Geopolitik" in 1936, published in Yugoslavia in 1941, under the title "What is Geopolitics?". Maull admits that it is not easy to make a distinction between political geography and geopolitics since geopolitics is a juvenile scientific discipline and for the reason that both disciplines frequently blend. Yet, Maull establishes a fact that political geography laid the foundations of the geopolitical building and that the scientific-historical development of geopolitics arises from political geography (Maull, 1941). Apart from that, Maull asserts that political geography is a theoretical science on which geopolitics is founded, whereas geopolitics itself is "applied political geography" (Maull, 1941). While, according to Maull, political geography researches into how certain spatial organs are conditioned by the ground, and the functional capabilities of those organs, i.e. researches into the state as a biologist does into a plant, an animal or man, a geopolitician is no longer a "biologist" but rather a doctor determining whether the organism (the state) is healthy and whether it corresponds with the spatial requirements of life.

When speaking about a state's borders, Maull alleges that there is a whole series of questions – ranging from forms to the geomorphological surface, the way the economic structure, traffic and settlements are treated – that fall within the competency of political geography. Geopolitics, which should make an assessment of, as Maull says, borders according to the needs of a state, continues to this, which also implies whether a boundary is spatially connected with the interiority of a state, whether it corresponds to the economy's requirements, foreign relations of a state, and the very idea of the state. If a fact is established that a boundary does not correspond to all those requirements, geopolitics has a task to propose a different, more favorable form of the boundary (Maull, 1941).

As we shall further see, Cvijić's works do, and to a great extent, contain these assessments and proposals, which certainly are not arbitrary, but rather very solidly scientifically and theoretically founded.

CVIJIĆ'S GEOPOLITICAL OBSERVATIONS

As we could see, one of the key theses of geopolitics asserts that the geographical position of a state of a nation has an important or even crucial impact on its foreign policy. Many a definition of geopolitics contains in itself exactly this relation of a (geo)space and politics. In his several works, Cvijić very explicitly highlighted the fact that Serbia's geographical position had very important implications for its political relations with its neighbors as well as for the economic circumstances. In his lecture "On National Work" in 1907, Cvijić first establishes a fact that Serbia has a central position in the northern part of the Balkan Peninsula as well as an almost central position in the ethnographic field of Serbian people, whose bigger parts are in Austria-Hungary and Turkey (Cvijić, 1991a). Naturally, such a position refers it to the role of Piemonte in bringing together the Serbian territories. At that time, Cvijić himself was aware of that, so he established the fact that due its central position in the Serbian ethnic space, Serbia was "a nationally-politically dangerous country" (Cvijić, 1991a). It was a dangerous country for the two mentioned empires, which then, at the beginning of the 20th century, had already been faced with serious crises concerning the legitimacy of the rule over the Serbs and other Slavic peoples. Apart from that, having in view a broader European context of the creation of the two opposed political-strategic blocs – the Central Powers and the Entente – Cvijić established the fact that Serbia was a danger for Austria-Hungary and generally Central Europe since it stood on their way to Minor and Central Asia. In that sense, he observed that Western Europe needed a defensive wall against the penetration of Central Europe (read: the Austrian-German bloc) towards Thessaloniki and that instead of Turkey, small Danubian states, first of all Serbia, could be the defensive wall for Western Europe, which means that, as he said, Serbia could "make common cause between its national interests and Western Europe's interests" (Cvijić, 1991a). As is generally known, seven years later, on the very eve of the First World War, Serbia amongst other things and for the reason of the importance of its geographical and strategic position obtained solidarity and was supported by, in the first place, Russia, only to be followed by the Western Europe, namely France and Britain. According to their character, these Cvijić's remarks are geopolitical par excellence since they determine the undoubted impact of a geographical position on the foreign policy of a country and on possible alliances, or rivalries.

Cvijić, however, went a step further – he considered an (un)favorable geographical position to have an impact to the same if not even to a greater extent on the internal political-economic circumstances of a state

as well. In that sense, his work dating back to 1908 "The Annexation of Bosnia and Herzegovina and the Serbian Issue", published on the occasion of the formal annexing of Bosnia and Herzegovina to the Austro-Hungarian Monarchy, is a rather characteristic one. Speaking about the economic-geographical position of Serbia prior to the famous Berlin Congress in 1878, Cvijić emphasized the fact that, via the territory of Bosnia and Herzegovina, Serbia could have transported its main exporting products – grains and cattle – to the Adriatic and had it further exported onto various foreign markets. Since the Berlin Congress, when Bosnia and Herzegovina was given to Austria-Hungary to "temporarily" administer it, Serbia's position abruptly deteriorated since the Austro-Hungarian authorities closed the routes via Bosnia and Herzegovina for exports from Serbia, so Serbia only had at its disposal two alternative routes – one was down the Danube to the Black Sea ports, and the other was via Vranje to Thessaloniki – both routes being expensive and technically bad. For that reason, Cvijić thought that there was no state in the then Europe with such a bad economic position as it was the case with Serbia after the Berlin Congress (Cvijić, 1991b). After the Berlin Congress, surrounded by the Dual Monarchy on the north and the west, Serbia had been no more than an Austro-Hungarian political-economic appendage for decades, which provoked unsettled social-political circumstances. Cvijić observed that Serbian people, unaware of the difficult economic and geographical position, opposing such a situation, pinned it all on the Obrenović Dynasty (Cvijić, 1991b). Cvijić says that Serbia was ruled with great difficulty and that Serbia "provides a classical example of how an unfavorable geographical and economic position can provoke an internal anarchy" (Cvijić 1991b). Such Cvijić's reasoning is also geopolitical since he does not find the cause of the internal political circumstances in Serbia in an economic, social, ideological or personal factor, but rather taking into account the category of the geographical position. Profoundly aware of the unsustainability of the Austrian annexation of Bosnia and Herzegovina as well as of the current geopolitical position of Serbia, which Cvijić referred to as "the Serbian problem", he comes to a conclusion at the end of his study that "the Serbian problem has to be solved by force", i.e. Serbia and Montenegro had to take advantage of the first favorable opportunity to discuss the Serbian issue with Austria-Hungary (Cvijić, 1991b). "Discussing the Serbian issue" is de facto nothing else but a euphemism for the redesigning of the borders in the Balkans – the uniting of South-Slavic peoples, irrespective of their origins and religion, from Trieste to Thessaloniki, and a deconstruction of the great monarchy that to a great extent was losing its legitimacy to rule over those same peoples.

As we could see, interpreting geopolitics as practical political geography, Otto Maull thought that it was a geopolitician's task to make assessments of borders according to the needs of a state, i.e. provide an answer to the questions of whether a boundary corresponded to requirements of the economy, foreign relations of a state, and the very idea of the state. During his career of a scientist, Cvijić channeled a significant effort he was making exactly in that direction, thoroughly contemplating the economic-political consequences that the Serbian borders had been producing prior to and after the Balkan Wars. As early as in his lecture on political geography at the beginning of the 20th century, Cvijić stressed a big economic importance of acquiring a maritime boundary, establishing the fact that "the maritime position of states is the most convenient one" (Cvijić, 1969). During the First Balkan War, around the end of 1912, Cvijić published his famous work entitled "Serbia's Access to the Adriatic Sea", in which he reasons in full detail a need for Serbia to gain a solid access to the sea. He established a fact that the Serbian economy was suffering due to its continental (closed) geographical position, especially since Austria-Hungary blocked the Serbian export and interrupted in various ways the Serbian production preventing it from penetrating the third markets. Recognizing the two potential routes for Serbia to gain access to the sea – to Thessaloniki and to San Giovanni di Medua, (Durrës) – due to the fact that Thessaloniki was occupied by the Greeks, Cvijić suggested that the second route should be adopted, which also implied the building of the railway connection through the Drin or the Mat valley. By stating in full detail the orographic features of the terrain of Kosovo and Metohija and Northern Albania, Cvijić wanted to provide the scientific reasoning regarding the route of a hypothetical communication, having in view the economic, technical and even political factors.

The key moment of this analysis of Cvijić's is the concept of an anti-ethnographic necessity. Admitting that the territory of Northern Albania was for the major part inhabited by the Albanians, Cvijić still pointed out absolutely in a geopolitical spirit that due to that fact Serbia could not give up on gaining access to the sea since, without that, it would not be economically independent. In other words, Cvijić highlights that the annexation of Northern Albania would be the occupation of the ethnographically foreign territory, but also adds that the occupation is conditioned, as he says, by "living needs" (Cvijić, 1991c). The concept of the "living need" (maybe only expressed in a different way) can relatively often be found in the geopolitical literature – from the Anglo-American, via the German all the way to the Japanese one. It implies designing solutions in cases of the demarcation of states or spheres of influence that might be confronting ethnic borders, legal principles or historical traditions. In this

work, Cvijić first of all had the economic interests in mind, but he also did his best to found his suggestion from other aspects, too. In a geographical respect, Cvijić highlighted the fact that the littoral region of Northern Albania makes one whole with Kosovo and Metohija. In an ethnic respect, he emphasized that assimilation and amalgamation processes between the Serbs and the Albanians had been taking place on that territory for centuries (frequently to the detriment of the Serbian ethnic presence), so the then Albanians of Northern Albania originated from the Albanians and the Serbs mixing with each other. From the point of view of history, Cvijić reiterated the fact that, until the invasion of the Turks, the countries of Northern Albania had for a big part been part of Serbia, whereas Southern and Central Albania had only been that during the biggest expansion of Serbia in the Middle Ages under the rule of Emperor Dušan (Cvijić, 1991c). So, apart from an economic necessity, Cvijić also made an effort to present the geographical-historical and ethnographic arguments for the annexation of Northern Albania to Serbia, too. Besides, Cvijić correctly noted that the antiethnographic drawing of borders in the Balkans was frequently inevitable due to the fact that the populations are mixed with each other and that, in that sense, the insular states only could remain completely pure (Cvijić, 1991c).

That Cvijić considered the Serbian borders in the geopolitical key is also testified by his work "The Geographical and Cultural Position of Serbia", published on the eve of the First World War, after the victorious Balkan wars and the great territorial expansions of Serbia. In his work, Cvijić follows the territorial growth of the Serbian state and the transformation of its geographical position due to the shifting of its borders. Speaking about Serbia in the period from 1815 to 1833, Cvijić established a fact that Serbia only had a territory of 24,440 km² and an unstable geographical position, pressed closely to the Sava and the Danube rivers. The first expansion made in 1833, when Serbia was added the territories that had been free as early as under the rule of Karadjordje, led to Serbia's covering as many as 37,740 km² now, yet without a qualitative change in its geographical position (it was still a country of the Sava and the Danube River Basins). No sooner than after the wars of 1876 and 1878 did that position qualitatively change – Serbia was significantly expanded southwards, it was added almost the whole basin of Južna Morava together with Vranje, Niš and Pirot, and had a territory of 48,300 km². In that way, Serbia also gained a special identity – as Cvijić says – Serbia became "the state of the Morava River, the Morava-River State" (Cvijić, 1991d). Apart from this, it was no longer a peripheral Danube-basin state, whereas its central position in the Balkans solidified. Cvijić noticed that the expan-

sion had been fateful to a certain extent because it had oriented Serbia towards further moving itself to the south, to the central Balkan area, to the place of the intersection of the main longitudinal and transversal communications enabling it the most favorable access to the Aegean and the Adriatic seas (Cvijić, 1991d). As we have seen before, Cvjić saw accessing maritime borders as a necessary precondition of Serbia's economic as well as political independence. Ultimately, after the Peace Treaty of Bucharest in 1913, Cvjić claims that only then did Serbia acquire a fully central position in the Balkans, and having mastered the basins of the Morava and the Vardar rivers, it became the Morava-Vardar state. Cvjić anticipated that the main communication artery leading to Thessaloniki would be made along the Morava and the Vardar rivers (Cvijić, 1991d). Apart from that, merging with Montenegro marked the disappearance of the Sanjak of Novi Pazar – a political isthmus – whose only one function was to separate the two Serbian states. Cvjić saw the contact between Serbia and Montenegro also as an opportunity to construct the railroad to Bar – expensive and unfavorable – but yet, as he said, “completely ours” (Cvijić, 1991d). This work of Cvjić's also represents a significant testimony of his not only political-geographical but also geopolitical views and interpretations. In that work, although not explicitly, Serbia is observed as a living organism developing in space, maturing, growing and, after the Balkan wars, taking its almost complete physiognomy, like a man who grew to his full psychophysical maturity and strength. Its first and second periods after its having been liberated from the Turks can be interpreted as its childhood age (Serbia's position was unstable); the period after the wars of 1876 and 1878 as its juvenile age (its central position was solidifying, but it was still far away from being fully territorially encircled); and the period after the Balkan wars can be treated as its climax – the mature and virile age – the period when it not only reaches a significant territorial format covering 87,800 km², but also a comprehensive political-geographical profile. Cvjić manifested the organicistic approach, which according to the author of this paper is quite a founded one, in his analysis of Serbia's big successes made during the Balkan wars. Then he noticed that those successes would not have been possible to make if Serbian people had not stepped into a special development period characterized by their great physical and moral indefatigability, which was somewhere in-between the haute culture of western nations and the primitiveness characteristic for e.g. the Albanians (Cvijić, 1991d). On the basis of this observation of Cvjić's, he can be assumed to have perceived the development of nations through a triad consisted of the stage of primitiveness, characterized by small cultural production but a big individual and collective energy; then a transitory

period of cultural resurrection, still preserving vital energies; and the last period, i.e. the haute culture age, almost verging on decadence.

CONCLUSION

The Author of this paper has made an effort to present, in the compendious form of a scientific paper, as many arguments as possible for the attitude that, apart from having been a political geographer, Jovan Cvijić was also a geopolitician. Rudolf Kjellen, the creator of the term “geopolitics”, considered it to be the science of the state as a geographical organism or a phenomenon in the space. As we could see, especially in his work “The Geographical and Cultural Position of Serbia”, Cvijić perceived Serbia exactly like that – as an organism rooted in the ground, the one that was developing over one hundred years or so (1815–1914) and gradually taking its real proportions, just like an individual that had developed all of its psychophysical capacities.

Should we start from Maull’s postulates that geopolitics is applied political geography, whose task it is to solve practical problems of a state, Cvijić’s certain works, especially “Serbia’s Access to the Adriatic Sea” are geopolitical indeed. Cvijić’s preoccupation with Serbia’s gaining access to the sea and the recurring analysis of its handicap of being a closed continental country as well as of all unfavorable political-economic consequences of its being closed as said are the clear manifestations of geopolitical reasoning and a view of the reality of the political map of the Balkans and Europe. Cvijić also demonstrated the same approach in his famous work “The Annexation of Bosnia and Herzegovina and the Serbian Issue”, where he conducted an analysis going one step further ahead, bringing into direct connection the bad geographical position of Serbia and its unsettled internal political circumstances, confirming the key attitude of geopolitics that it is possible to find a relation of conditioning between geographical (natural) factors and certain political phenomena or conditions.

Even if Cvijić’s opus were assessed from the point of view of the contemporary understanding of geopolitics – as studying the whole of international relations from a spatial and a geographical perspectives, in which the impact of geographical factors on the foreign policy of states and rivalries of ruling over disputable territories between two or more states, or between different political groups and movements under arms are discussed – one could observe that there are at least two elements stated in this definition that are present in his works. The first element is related to the impact on geographical factors on the foreign policy of states, and the

other one concerns the rivalries of states over disputable territories. We have already spoken about the impact of geography on a foreign policy. As far as the second element is concerned, a fact can be established that it is running as a red thread through all Cvijić's political-geographical and geopolitical studies cited here. Cvijić observed the majority of the unsolved territorial issues through a prism of confronting and competing, first of all between Serbia and Austria-Hungary. In a well-argued manner, he pointed at the fact that behind all regional disputable territorial issues there are interests of sub-continental and continental proportions, such as the German (Austrian) penetration to the south-east of Europe.

Cvijić's geopolitical attitudes, and geopolitics is an applied science, were sometimes the subject matter of controversies over and accusations of national bias and intolerance. Cvijić's concept of an antiethnographic necessity is the one to have probably provoked the largest number of controversies. Cvijić himself had to clarify later that the concept had not been envisaged as a universal principle and in 1913, in his letter to a Romanian journal *L'Indépendance roumaine*, he highlighted that antiethnographic necessities were only related to Serbia's gaining access to the Adriatic Sea, Shkodër and the surroundings (Cvijić, 1923). He particularly indicated that it was not just a Serbian whim, but rather an objective need.

Unfortunately, Cvijić was later outspokenly contested for that, even in Serbia and even in prefaces to his collected works, from the positions of the bankrupted Yugoslav ideology of brotherhood and unity. In any case, his sober remarks and observations are topical today as well, more than one hundred years after their publication, while the ideologically based criticisms and his critics are slowly falling to oblivion.

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