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SHORT HISTORY RECAP OF SERBIAN GEOLOGY

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Abstract: The author presents in a concise form the history of geology in Serbia and the Republic of Srpska. He begins with knowledge about the Earth in the Middle Ages among Serbs. Then, he continues in chapters to write: about the work of foreign geologists in Serbia and the transfer of knowledge from geology to our environment by domestic authors. This is followed by the emergence of the first geological centers and the influence of J. Pančić's lectures on students' interest in our science. The formation of the domestic school and staff with J. Žujović. Notable are: the progress of geology between the two world wars and the rapid development of the science and the profession after the Second World War. Its ups and downs have been connected with the state in the country until today. This also includes the separation, organization and activity in the geology of the Republic of Srpska.

Key words: history, geology, Serbia, Republic of Srpska.

1. INTRODUCTION

There is no complete, continuous and comprehensive history of Serbian geology in the domestic geological literature. Everything that has been published about it is either incomplete and fragmentary or has been compiled as an extensive topic on some segment of that history. The author of these lines had in mind that a concise presentation of this topic is necessary for every geologist, for the younger ones to find their way through the abundance of events over several centuries and for the older ones as a reminder. He is impatient in waiting for the answer to the question: how right is he? Or is it all the other way around?

2. PREHISTORY

In the late Middle Ages, between the 10th and 14th centuries, there were two types of knowledge about the Earth and its rocks among the Serbs – practical and theoretical. The practical knowledge came from experience, which came from mining, metallurgy, construction, stone-cutting, lime-making, pottery, brick-making, jewelry and other crafts. These knowledges were artisanal and were mostly traditionally cultivated in families. Particularly developed was the knowledge of minerals and ores, searching for them in various terrains and monitoring their exploitation in "holes", as mines were called at the time. According to the "Mining Code" (1412) of Despot Stefan Lazarević [1], this (geological) work in the mining was called "uzboj"[1].

Theoretical knowledge about the Earth came from the so-called hexaemeronal literature[2], that is, from secular-sacred writings known as the "Six Days" (Hexaemeron) [2]. Several have been translated into Serbian, but only four are considered significant. Their authors were: Jovan Egzarh (translation from 1263, Grammar by Teodor), Basil of Caesarea (1439, translation of Nikon of Jerusalem), George of Pisidia (1385) and John Chrysostom (1633). The homilies of Basil of Caesarea stood out for their interpretations and influence. In wider excerpts, they were available to the Serbian readers from the eclectic Bulgarian

1 Searching for minerals in mines, monitoring their exploitation, according to the Mining Code of Despot Stefan Lazarević

2 Literature that in ancient times used a specific compositional structure, verses in hexameters

"Six Days" by Jovan Egzarh, and later from more recent translations and transcriptions. From these writings translators, copyists, readers and listeners were informed about how, with the help of ancient philosophical ideas and naturalistic interpretations, biblical stories about the Earth could be explained, that is, about its origin, composition, land, water, sea, minerals, metals, fossils in amber, etc. Those writings were mostly based on "The bible" and were referred to the views of Platon, Stoic, Democritus and partly Aristotle. Only at Pisidia, in his poetically written "Six days" are Heraclitus views about the change of the world.

Modern-day scientific mineralogical and geological studies of Serbia began with the works of foreigners: the Italian polymath L. F. Marsigli (1726), the German miner and mountain geologist baron F. Herder (1835), and the French geologists A. Boue (1840) and A. Viquesnel (1842-1844) [3]. Of particular importance were the recorded results of specific field investigations carried out by Herder and Boue, because their texts laid the modern scientific foundation for all subsequent geological research. Herder transferred to Serbia the knowledge and experience of the famous Freiberg Mountain geological school and Saxon miners and suggested what, how and where it should be done. Boue systematically traveled across the Balkan Peninsula several times and recorded data on the geological composition of the terrain along the way. He published his observations after these investigations, and based on all of this, he made a synthesis of the "Geological Sketch of European Turkey" within the extensive work "European Turkey" (1840). In addition to other terrains, it also contains the foundations for the geology of then Serbia. Foreign experts often participated in the exploration of minerals in Serbia later, until the end of the 19th century. They worked in other Serbian countries until 1918.

Knowledge from fundamental geognosy[3] of the 18th century was transmitted to Serbs by local polyhistorians almost exclusively from German, Wernerian sources: Z. Orfelin (1783), A. Stojković (1801-1803), P. Kenđelac (1811) and others. The latter also presented some of his completely original interpretations of the origin of the Earth and mountains [3,4].

3 Geognosy is a term that refers to the study of land properties or geographical knowledge. The term is sometimes used synonymously with the scientific study of soils, landscapes, and natural processes on Earth

3. FIRST PERIOD OF DOMESTIC GEOLOGY

Domestic high school teaching of geognosy and mineralogy was started by professor A. Volni in 1794 at the Gymnasium in Sremski Karlovci. At that time, a collection of minerals, rocks and fossils was also established for teaching purposes at that school. It was the first Serbian natural history and geological collection, which has been preserved to this day [5].

The official beginning of state mining and geological research in the Principality of Serbia began in 1848 with the establishment of the Mining Department of the Ministry of Finance and the opening of Majdanpek [6]. Between 1848 and 1858, Majdanpek was the first state mine and the main center for geology and mining in the entire Serbia. Foreign and domestic mining engineers and geologists from that center explored all raw materials and opened mines. Among them was the mining engineer and officially the first Serbian geologist, Đorđe Branković. He was the founder of the Mining Department.

After the closure of Majdanpek [6], from 1859 all geological and mining works were continued and managed from the Mining Department until the World War I. Over time, two major changes occurred. In 1883, this Department became part of the new Ministry of National Economy, and from 1891, the first Serbian doctor of geology, S. Radovanović, formed the "Geological and Mining Museum" and the "Department for the Making of Detailed Geological Maps of the Kingdom of Serbia and Geological and Mining Maps". Radovanović was successfully succeeded in the position of official state geologist in that center in 1897 by D. Antula, the second Serbian doctor of geology. He further advanced professional geological research in Serbia. Their practical work in the field was based on European geological knowledge from the first half of the 19th century, which they acquired in Belgrade and Vienna, and on domestic experience.

The second center, for geological teaching and studies of Serbia, was established by J. Pančić in 1853 at the Lyceum when he began teaching the subject Mineralogy and Geognosy. Within the framework of this center, he and his students also carried out modest geological observations of the fields of Serbia and wrote about them. He worked systematically on the development of domestic professional terminology and managed to interest his students in geology. He also published the first geology textbook

(1867) with a series of examples from our country. This was an important preparation for the formation of domestic personnel. This center developed over time, changing its organizational structure until today. There was always something being done in the field, but the main job at the center was the geological education of domestic experts [6].

Similarly, third center was established at the Serbian Orthodox High School in Novi Sad in 1871, when Aleksandar Popović joined it, after completing his natural science studies in Budapest. He and his slightly younger colleague Stevan Nedeljković, in addition to teaching geology, conducted research and mapping of Fruška Gora. Popović also studied the terrain of Serbia in 1874. He even applied for a doctorate in geology under Professor Sabov at the University of Budapest. The two young geologists worked like true professionals, but, unfortunately, they passed away one after the other, so this center quickly closed down (1878). His important contribution was in the high quality of the researchers' work in the field, the development of local professional terminology, and the critical review of Pančić's names for rocks and phenomena [7].

4. EDUCATION OF DOMESTIC PERSONNEL AND OCCUPATION

With the arrival of J. Žujović (1880) [8], at the independent Department of Mineralogy and Geology, which had lagged behind Pančić's dismembered "Jestasvenica", the systematic education of young geologists began at the Faculty of Philosophy of the Higher School in Belgrade. Besides that, the Faculty of Technology taught applied geology in civil engineering. In addition to lecturing, Žujović began to develop the first geological map of Serbia at a scale of 1: 1 500 000 (1882, 1886), improved teaching by establishing new departments (for mineralogy and petrography and paleontology) and, together with his students and associates (S. Radovanović, S. Urošević, P. Pavlović, S. Stevanović, D. Antula and the younger generation), began to study domestic terrain in more detail. Before the session of the Assembly, which fell with the Government, the proposal to establish a State Geological Committee failed (S. Radovanović, 1893).

By publishing the results of geological work in its own "Geological Annals of the Balkan Peninsula" from 1889 and at the Serbian Geological Society, founded in 1891 (Records of SGS[4]), a well-established Belgrade geological school was formed. The results of the joint efforts of the aforementioned researchers were synthetically published at the turn of the nineteenth and twentieth centuries. These are Žujović's monograph "Geology of Serbia" in two volumes (1893, 1900), then, the study by J. Cvijić on the structure of the mountains of the Balkan Peninsula (1900) and the description of all ore deposits in Serbia by D. Antula (1900). These very important works testify to the then quite balanced relationship between our fundamental and applied geology. Thus, domestic geology followed the contemporary trends of science in Europe on an equal footing.

Until the 1920s, geology [6] was developed at the University, in the Mining Department (D. Antula), the Natural History Museum of the Serbian Land (P. Pavlović) and in the Seismological Institute (J. Mihailović). At that time, there were only a few active professional geologists, the rest were actually geological pedagogues. In the Department for the Making of Detailed Geological Maps at the Geological Institute, detailed geological maps were recorded in Eastern Serbia (first in Đerdap, 1901-1902, then, later in other parts), in Western Serbia (Krupanj, Šabac and Valjevo) and in the vicinity of Belgrade (1909-1911). The first domestic geological dissertation was defended in Belgrade (V. Petković, 1908). Gradually, elements of applied geology were introduced into various activities. Services were provided to mines for their needs. Earthquakes in Serbia and surrounding countries were monitored instrumentally. Mineral, rock, ore and fossil materials were collected from the field, processed and arranged in the Museum. Discussions were held and hydrogeological conclusions were made about the water supply of Belgrade, etc. However, engineers still acquired knowledge of mountain geology only during their studies in Central Europe. In carrying out almost all of these geological works, the main support for the participants was the Serbian Geological Society. It had a tradition, institutional authority, internal organization, and a diverse but very active and diligent membership ready to accept various tasks.

During World War I [6], Austro-Hungarian "war geologists", mostly Hungarian, worked in occupied Serbia on the creation of a comprehensive

4 Serbian Geological Society

geological map at a scale of 1 : 200 000 and on prospecting mineral resources. Their data were published only in the 1920s and are of varying quality and importance. Some of the authors took into account what Serbian geologists had done before them, while others arrogantly ignored it, to their own detriment. From Austria, O. Ampferer and W. Hammer were in the field, and from Germany, F. Kossmat.

5. PERIOD BETWEEN TWO WORLD WARS AND OCCUPATION

After World War I [9], the Geological Institute of the University was strengthened in terms of personnel by V. Petković and V. Laskarev (who had emigrated from Russia), and J. Tomić and B. Dimitrijević arrived at the Mineralogical Institute. In special groups, at the Department of Natural Sciences and Mathematics of the Faculty of Philosophy, education of geological-paleontological and mineralogical-petrographic experts was carried out. Geology, in the form of special departments and subjects, was developed at the Technical and the new Faculty of Agriculture and Forestry (J. Žujović, M. Luković, B. Dimitrijević). Thus, along with regional geological subjects, applied geology officially found its place in higher education. Greater interest in the study of geology emerged.

New needs and new personnel finally created the conditions (at the proposal of the SGS) for the opening of the Geological Institute in the Kingdom of Yugoslavia (1931), which was under the jurisdiction of the Ministry of Education. In it, a young generation of professional geologists (S. Milojević, M. Protić, M. Pavlović, V. Simić, V. Mikinčić, K. Petković) continued the systematic geological mapping of the country, which was the main task of the Institute. It was very important for the profession that this Institute took over all the completed maps at a scale of 1 : 100 000, mostly from Eastern Serbia, from the University's Department of Geology, and published them in a short time. New forces emerged at the University (K. Petković, B. Milovanović, S. Pavlović, Z. Bešić, G. Gagarin) and the preparation and defense of doctoral dissertations became more frequent. Gradually, more and more jobs were taken up that required knowledge of applied geology (in mines, construction, water supply, balneology, etc.). Geology as a whole, however, was constantly under the jurisdiction of the Ministry of Education. This progress and rise in the development of domestic fundamental geology was interrupted by World War II.

A cross-section of all previous knowledge of the geology of Serbia was synthesized on two maps. First, on the Geological Map of the Kingdom of Yugoslavia 1 : 1 000 000 by K. Petković (1931), and second, within the Geological Map of the SFRY 1 : 500 000 by V. Mikinčić, which was compiled and published only in 1953.

During the occupation, domestic geologists did almost nothing. Some were imprisoned in Germany, and six of them, under the direction of a German commissioner, copied old reports and redrawn old maps while housed in the small Geological Institute in Belgrade. Some work was also done on the field. In one of the rare field assignments in the vicinity of Takovo, M. Gočanin (1942), who had been a high school professor until the war, was killed. In the same year, V. Čubrilović and M. Kojić, who was the first president of the SGS after Žujović, also died. It is interesting that in 1942, geology was transferred from the jurisdiction of the Ministry of Education to the Ministry of Mining, according to a proposal that appeared just before the war. This continued after the war, but on the basis of a new decision.

6. THE TIME OF SOCIALISM BUILDING

After the end of World War II, according to V. Simić [10] and S. Vujić [1], geology in Serbia gained new momentum. In the world and in our country, major changes occurred both in fundamental geology and in its transmission to applied geology, significantly, in all domains of applied geology. These new processes took place in our conditions in two main areas: in the education of personnel and in practice.

At the University, two educational units were established in 1945: the Geology and Paleontology Group (K. Petković, V. Laskarev, P. Stevanović, etc.) and the Mineralogy and Petrography Group (J. Tomić, S. Pavlović, M. Ristić, etc.) at the Faculty of Philosophy, from which the Faculty of Natural Sciences and Mathematics soon separated. The first generation of graduated geologists and mineralogists completed their studies in 1949.

At the Technical Faculty, which soon transformed into the Technical Higher School, however, in response to the new needs of the economy, only a Geology group was formed at the Mining Department (by decree in 1946) and later a separate Geological Faculty (M. Luković, B. Milovanović, M. Ilić, D.

Prosen, B. Stepanović, etc.). The first generation of graduated geological engineers completed their studies in the year 1950. For planned state needs, intensive education of geologists and geological engineers and geophysicists began. At first, several dozen and later hundreds of young experts graduated each year. By the 1980s, about 2 000 geologists had graduated.

In the early 1960s, the integration of the entire higher geological education at the Faculty of Mining and Geology in Belgrade was carried out, which thus became one of the strongest educational centers in this part of Europe. From the very beginning, university teaching introduced directions (regional geology, paleontology, exploration of mineral deposits, mineralogy, petrography with geochemistry, hydrogeology, engineering geology and applied geophysics) and directions in which students were enrolled from the first year. This introduced a specialization into their education that was too early for a small country. Once established, this model was persistently carried over later, with minor variations.

In practice, there was a significant change in the position of geology as a profession in the social structure, because in 1946 it was transferred from the sphere of consumption to the sphere of production throughout Europe. A new general attitude towards geology emerged. It became an integral part of the economy. It, in turn, needed experts capable of solving all the problems arising from the geological composition of the soil for any object. During the fifties, the main task of geologists was the search for metallic mineral raw materials, coal and oil. Everything was subordinated to this, and fundamental geology was reduced to the personal interest of individuals. It became necessary to introduce qualified experts of all profiles into the work. Graduated engineers and geologists immediately joined several geological and related institutions that grew rapidly: the Institute for Geological and Geophysical Research of Serbia, the Geological Institute of the Serbian Academy of Sciences and Arts, the Geoinstitute, Geosonda, Energo project, Kosovo project, the Institute for Roads, the Natural History Museum, etc. Special geological services were also formed in mining basins and construction companies, sometimes with numerous experts (Trepča, Bor, Majdanpek, Naftagas, Kolubara, Kostolac, Zajača, Energs project, etc.).

In the early 1950s, Žujović's old idea from 1905 about congresses of South Slavic geologists was realized in Yugoslavia. Over time, these became very important scientific and professional gatherings where important geological issues in the country were discussed and concluded.

New personnel, new jobs in the country and abroad, new equipment, knowledge and experience, and rich libraries enabled the unimaginable flourishing of geology in Serbia from the late 1950s to the late 1970s. At that time, work was based on a geological mapping of the entire country at a scale of 1 : 100 000 (Basic Geological Map, in the working version of 1 : 25 000). Through extensive and complex work on that large project, very significant broad support was achieved for domestic fundamental geology, which had previously been largely neglected. Modern and advanced work techniques were also being mastered in many other geological disciplines: sedimentology, engineering geology, hydrogeology, metal deposits, coal geology, oil geology, geophysics, geochemistry, technical petrography, etc. In this regard, the large geophysical project of deep seismic sounding of the entire country (1965-1970) is particularly noteworthy. Well-educated geologists were very successful in both fundamental and applied geology, which usefully complemented each other in interaction. This brought radical changes in the sphere of all completely independent disciplines of applied geology, but perhaps most of all in the research of mineral deposits. This was most clearly reflected in the Symposium on the Application of New Concepts in Tectonics and Mineral Deposits in Yugoslavia, held in 1974 at the Faculty of Mining and Geology in Belgrade.

A series of geological journals were launched (Annual of the Serbian Academy of Sciences, Proceedings of Natural history museum, Sedimentology and Geoinstitute, Bulletin of LMBM[5], Papers of the Geoinstitute, etc.). Since the mid-1970s, modeling and application of computer technology have been gradually introduced into domestic geology, which has greatly improved and accelerated all geological works.

A very important role, in the new post-war conditions, was played by the renewed Serbian Geological Society [11], as well as the newly formed Union of Mining and Geological Engineers and Technicians in the Serbian Geological Society. Several hundreds of members of both associations have contributed to the improvement and development of domestic geology as a whole for decades. Geological research was

5 Laboratory for mechanics of building materials

regulated by a special Law (1972), which provided regular procedures in these matters and regulated their financing. The results of this extensive and qualified research work [1] were compiled: on two geological maps (Geological Map of the Socialist Federal Republic of Yugoslavia 1 : 500 000 edited by the Geoinstitute in 1972; and Geological Map of the Socialist Federal Republic of Serbia 1 : 200 000 by B. Milovanović and B. Ćirić in 1966) and in the thirteen-volume monograph "Geology of Serbia" edited by K. Petković and published by the Faculty of Mining and Geology in Belgrade (1975-1987). The Geological Bibliography of Yugoslavia was compiled, and contained in seven books everything published on the geology of Serbia until the end of the 1970s (1954-1977).

The 1970s also brought three very negative developments. The famous Constitution of 1974 and one Law forcibly determined the secrecy of all geological data from Yugoslavia, and the second Law established the organization of the economy in the country on the principles of the invented "theory of associated labor". Due to the alleged defense security of the state, the first Law had drastic consequences on all aspects of geological studies in Serbia, especially on domestic and more than necessary and very important international cooperation. According to the second Law, the entire work structure in the state was broken and fragmented into autonomous entities, the so-called "organizations of associated labor" (OUC[6]). This was radically implemented, under the strong influence of the selfish and autistic disintegration forces of that time both in education and in professional geological houses. Thus, at the Faculty of Mining and Geology, the geological departments were transformed into completely independent, very poor "financial entities" that freely changed curricula, abolished subjects and decided on the implementation of teaching processes. The Geoinstitute broke up into several completely independent institutes (for geophysics, for metals, for non-metals, for engineering and hydrogeology) which often appeared as competitors to each other on the market. Geophysics was separated into an independent working organization and later integrated with Naftagas from Novi Sad. Funding for education and research was transferred from the state to republican and regional "self-governing interest communities" (MUC[7]), and became fragmented, sloppy and, to a significant extent, burdened with malfeasance.

With all the above, in the seventies (since 1978), the work on the so-called "Thematic Geological Map" was introduced in the Republic of Serbia, with a series of behind-the-scenes manipulations. With this, simply incredible, strategic mistake in the long-term policy of geological mapping of the state, the members of the old federal Commission tried to obscure and relativize their great ignorance and erroneous decisions, which they made back at the time of the introduction of the so-called "Complex Geological Map", composed of three independent maps (1954-1957). This expensive and unsuccessful experiment in creating a "map without a map", despite all warnings and opposition, nevertheless lasted for two decades, thanks to the well-established partial and corrupt interests of individuals (led by the biggest "actor" in geological mapping in our country, M. Dimitrijević) and government representatives. This was also greatly facilitated by then official socialist economy of "joint labor and resources based on negotiation and agreement" with catastrophic consequences.

The three aforementioned "innovations" in the geology of Serbia have severely damaged and set back everything that had been gradually and painstakingly built and worked on in geological education and research for decades. However, this was only an introduction to the following even more serious consequences for our profession and science.

In the 1980s, the country entered a major debt crisis with foreign creditors. From $2.1 billion in debt in 1970, liabilities to the convertible area rose to $18.9 billion, with the highest borrowing occurring in the second half of the 1970s. The tense and very complicated negotiations on how to repay this debt lasted for three years (1981-1983). The solution was implemented under the Law adopted by the Parliament on July 3, 1983 on the conversion of this debt into long-term debt. A catastrophe of state finances was avoided, but many internal banking problems remained. All this caused a drastically increased crisis of the state and the entire economy [12].

There is a general decline in living standards and major shortages. Further disintegration of geological services is underway, then, major problems arise in financing geological research, personnel are lost, general stagnation and regression of the profession. A relatively fortunate circumstance was

6 Organizational units in companies
7 Management units in companies

that geological companies, from previous years, had contracts abroad (Iran, Libya, Turkey, Mozambique, etc.). This made it possible then and somewhat later, at least partially, to overcome the aforementioned difficulties, especially in the sphere of regional geology and mineral deposits. This fact helped to preserve, to some extent, important parts of the accumulated knowledge, capacity and "substance" of Serbian geology through the difficult transition (after 1989). As a novelty, private initiatives in geology are slowly starting to appear. Small agencies and companies are opening up that perform geotechnical, hydrogeological, engineering-geological, geophysical and other work for third parties.

7. THE LAST PERIOD

In the 1990s, with a deep state and political crisis, the collapse of the country, the establishment of the new state of the Federal Republic of Yugoslavia, and the introduction of a multi-party system in Serbia, new laws were passed in 1992. Serbia was exposed to uncertain steps in the transition from failed attempts at a planned, market-planned and so-called contract economy to a market economy. This brought new complex changes in higher education, the organization of geological research and the position of geology in society.

Geological work, carried out by independent legally regulated business entities, moved, again through new legislation, to the "service activities" sector. Completely new working conditions emerged. However, geological companies were not prepared for this, so they found themselves in a fight for survival, exposed to ruthless competition, staff attrition, loss of knowledge, obsolescence and deterioration of equipment, libraries and funds. In addition, they came into the sphere of strong corrupt interests and in serious danger of far-reaching and unpredictable consequences of criminal privatization, which was fortunately prevented.

In higher education of geologists, the very serious consequences of the long-term inappropriate and atomized OUC have been replaced by a return to almost the same state as before the introduction of OUC. This means that the directions that existed before the introduction of OUC have returned to education. A major and important innovation from this time was the state decision to join the Bologna Declaration.

The collapse of the second Yugoslavia (1990), galloping inflation (1993), UN Security Council sanctions imposed on Serbia (1991-1995), and the savage 78-day bombing of the country by the NATO alliance (1990) increased the already considerable difficulties in geology. All this, as well as the accelerated transition and privatization, between 2000 and 2006, led to its real collapse in Serbia. All the serious meetings and round tables, organized by the SGS, MGF and MUC, on the importance and need to preserve geological organizations and acquired knowledge, were worthless. This negative trend and agony continued until 2006. It was a turning point with major turning points in all domains of domestic geology.

In 2006, all the geological institutes in Belgrade were integrated "administratively and voluntarily" into a single company, the "Geological Institute of Serbia". This intervention halted the decline. The consolidation and concentration of personnel, equipment, funds and knowledge began. Finally, in 2011, the process of stabilization and reconstruction was completed with the formation of the state-owned "Geological Institute of Serbia". This was a new institution that has since carried out all basic geological research on its territory on behalf of the Republic of Serbia. Everything else was left to the free market through smaller private companies and agencies, which was also a major change in domestic practice. Behind everything, however, there was one particularly bad consequence. During the transition, in the process of resettlement, due to the disinterest and carelessness of the people responsible, parts of the collections, libraries, expert funds, archives and equipment of some institutes (especially from the former Geoinstitute) disappeared irretrievably through theft and neglect, which is a huge and incalculable damage.

At the Faculty of Mining and Geology, all preparations for the transition to studies in accordance with the Bologna Declaration of 2005 have been completed. Instead of the old curricula, already in the 2006/2007 academic year, students were enrolled in basic academic studies (four years) according to new study programs in: geology (with five modules from: regional geology, paleontology, mineralogy and crystallography, petrology and geochemistry, and economic geology), hydrogeology, geotechnics and geophysics. Master's (one year) and doctoral studies (three years) were organized three years later and, through new accreditations, regional geology and mineral re-

sources research were transferred from the module level to basic academic studies.

Throughout all the aforementioned difficult and turbulent times, one of the consistently reliable and main pillars of domestic geology was the Serbian Geological Society. Even in the most difficult conditions, when it itself was struggling with enormous existential difficulties, it gained the inner strength to care, take action and fight for the establishment of a new status for geology in the country and the achievement of its new social position.

In the negative trend of the state and status of the geology of transitional Serbia, as a great miracle, several extremely positive phenomena have also appeared. The vast knowledge of the geology of Serbia, collected and systematized over decades, has received its synthesis forms. Continuity in holding geological congresses has been enabled (13th Herceg Novi 1998; 14th Novi Sad 2005; 15th Belgrade 2010; 16th Donji Milanovac 2014). The printing of the Basic Geological Map of the SFRY at 1 : 100 000 (1989) has been completed, which includes our entire Republic on 80 sheets, partially or in whole. Systematic work on recording the Geological Map of Serbia on a scale of 50 000 has begun. The effective application of modern plate tectonics to solving the geological problems of Serbia, which began as early as 1970, was introduced in a timely and very successful manner. It continued and was then experiencing its highly creative and powerful rise. This is reflected in the appearance of several appropriate syntheses [1] on the geology of Serbia (A. Grubić, 1980; M. Dimitrijević, 1995). There are also more conflicting opinions (M. Anđelković, 1982; B. Ćirić, 1996). The concept of terranes was also readily and effectively introduced into regional geology (S. Karamata, 1989, 2006). An excellent Symposium on the Geology of Đerdap (1997) was held with Romanian geologists, the content and results of which had a strong impact on the surrounding area and in Europe. In some domains, Serbian geologists even led the way in the region, so it seemed as if nothing bad had happened to our profession in the country. But that was only an illusion. The decline was catastrophic.

During the dissolution of the SFRYin the 1990s, the Republic of Srpska was definitively confirmed on the basis of the Dayton Agreement. In that entity, the "Republican Institute for Geological Research of the Republic of Srpska" [13] was established in 1992. It appears as one of the legitimate successors of the "Geological Institute" of the former Bosnia and Herzegovina, which was founded in 1912 by then Provincial Government of Bosnia and Herzegovina. Now this Institute has the status of an administrative organization within the Ministry of Energy and Mining of the Republic of Srpska (since 2008) for the needs of the state. It is headquartered in Zvornik and operates through 12 macro-projects: preparation of basic geological maps; exploration of mineral resources; basic engineering geological and hydrogeological research; geochemistry; geophysics; geothermal waters; geothermal energy; geohazard; geological heritage; and the establishment of the geological information system of the Republic of Srpska. In addition to it, in the Republic of Srpska, the raw material part of geology is taught at the Faculty of Mining in Prijedor. Of the many organizations dealing with geology, there are several agencies and two significant institutes: the Technical Institute in Bijeljina and the Mining Institute in Prijedor, which deal with geotechnical research (the first) and research of mineral raw materials (the second).

It should not be overlooked, in this brief consideration of Serbian geology, that our geologists have had a significant place in both academies of sciences and arts (SASA[8], 1886 and ASARS[9], 1996) from their founding until today. They worked diligently and successfully, and noticeable traces of this have remained. The difficulties described here did not bypass them either.

Here, finally, it is necessary to emphasize that domestic geologists, throughout the aforementioned time, in studying the geology of Serbia, had the help and support of colleagues from abroad who usually acted as individuals. Until the World War I, these were mainly Austrian, German and rare Hungarian and Bulgarian geologists. Between the two wars, mainly Germans and two Englishmen worked here. Immediately after the World War II, for a short time, German and Russian specialists in mineral resources helped, and then French doctoral students from the Sorbonne. Recently, an interesting inversion has occurred, with foreign companies working in our fields with departments composed mainly of domestic geologists.

8 Serbian Academy of Sciences and Arts
9 Academy of Sciences and Arts of the Republic of Srpska

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КРАТКА ИСТОРИЈА СРПСКЕ ГЕОЛОГИЈЕ

Сажетак: Писац у сажетој форми излаже историју геологије у Србији и Републици Српској. Почиње са знањима о Земљи у средњем веку међу Србима. Затим, наставља по поглављима да пише: о раду страних геолога у Србији и преносу знања из геологије у нашу средину од стране домаћих аутора. Следи настанак првих геолошких центара и утицај предавања Ј. Панчића на интерес студената за нашу науку, те формирање домаће школе и кадрова са Ј. Жујовићем. Посебно се издвајају: напредак геологије између два светска рата и нагли развој науке и струке после Другог рата, њени успони и падови, повезани са стањем, у држави све до данас. Ту је укључено и одвајање, организација и делатност у геологији Републике Српске.

Кључне речи: историја, геологија, Србија, Република Српска.

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