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Дигитални репозиторијум Рударско-геолошког факултета Универзитета у Београду

[ДР РГФ]

Witness of the history: A hundred years old the geological hammer of Jovan Zujovic | Ljupko Rundić | Annales Geologiques de la Peninsule Balkanique | 2021 | |

10.2298/GABP210607004R

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Witness of the history: A hundred years old the geological hammer of Jovan Žujović

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Key words:

*Geological hammer,
Jovan Žujović,
Serbian Geological Society,
1921–2021.*

Кључне речи:

*Геолошки чекић, Јован Жујовић,
Српско геолошко друштво,
1921–2021.*

Abstract. During the celebration of thirty years of existence and work of the Serbian Geological Society (SGS) on February 10, 1921, as a sign of great respect toward Academician Jovan Žujović, the President and founder of the Serbian Geological Society and father of the Serbian Geological School, all the members of SGS gave him an unique geological hammer with engraved dedication and their signatures. Over the past hundred years, many generations of geologists have found inspiration by looking at the hammer and sharing this story with great reverence. Today, when geologists visit the Memorial Room of Geology (Faculty of Mining and Geology, Kamenička Street No. 6), where this hammer is carefully kept as well as other valuable exhibits from the history of Serbian geology, similar feelings fill us.

Апстракт. Током обележавања тридесет година постојања и рада Српског геолошког друштва 10. фебруара 1921. године, у знак великог поштовања према академику Јовану Жујовићу, председнику и оснивачу Српског геолошког друштва и српске геолошке школе, чланови СГД поклонили су му јединствени геолошки чекић са угравираном посветом и својим потписима. Током протеклих стотину година, многе генерације геолога проналазиле су инспирацију гледајући чекић и делећи ову причу с великим пијететом. Данас, када геолози посећују Спомен собу геологије (Рударско-геолошки факултет, ул. Каменичка бр. 6), где се пажљиво чува овај чекић као и други вредни експонати из историје српске геологије, прожимају нас слична осећања.

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Introduction

The modern archaeological studies suggest the geological hammer is the oldest professional tool and much older than thought (PALMER, 2016). The first record about hammer usage by some hominid group who lived onto the western shore of Lake Turkana, Kenya was given by HARMAND et al. (2015). They discovered the 3.3-million-year-old site where in situ stone artefacts were in spatial and temporal association with Pliocene hominin fossils who lived in a woody habitat. Nowadays, it is the world's largest permanent desert lake and belongs UNESCO World Heritage Site. The discoveries of stone artefacts there show that 'proto-geologists' (the term used by PALMER, 2016) did know some rock features (e.g. hardness, fracture features, etc.). Based on artefact composition, it seems they apparently preferred volcanic rocks such as basalt for production of primitive hammers (PALMER, 2016). Based on this, as well as on the other archeological records, it can be implied that stone hammers were created much earlier than thought. From Middle Ages times, hammers diversified into a lot of forms. The main reason was an increasing number of trade specialisations (e.g. blacksmith, mason, shoemaker, carpenter, jeweller, geologist, etc.). As PALMER (2016) states, up to the 19th century the Sheffield trade catalogues advertised around 80 different kinds of hammer.

One of the world's greatest collections of geological hammers is stored in the Sedgwick Museum (Cambridge, UK). It includes 41 hammers collected from a century and a half long period (from 1873). Some of them were owned by eminent 19th century geologists, such as William Buckland (1784–1856), William Daniel Conibear (1787–1857) and Adam Sedgwick (1785–1873) (PALMER, 2016).

Today, probably the largest hammer museum in the world (opened in Haines, Alaska in 2005) have more than 10.000 different exhibits.

This historical note on 100 years old hammer have a lot of symbolism and as the author, I was strong intention to published it in this journal. Namely, the journal, *Geological Annales of Balkan Peninsula*, was founded in 1888. by Jovan Žujović himself. The author had the privilege and real pleasure to share this story with the public and

commemorate the rich and unknown moving geo-heritage of Serbia.

Recovery of SGS in the post-Great War period

In the first years after the Great War, the Kingdom of Serbia although one of the victorious countries, was completely human and materially destroyed. Nothing changed when it entered the state union called the Kingdom of Serbs, Croats and Slovenes (1918–1929) and a long and difficult recovery began. The struggle to return to a more or less "normal life" was waged in all fields. Much was expected from geology as a profession. The prominent Serbian geologists of that time were in the last years of the war in various missions throughout Europe, where they fought for the Serbian interests and took care of the education of young personnel (LUKOVIĆ, 1954; GRUBIĆ, 1996). Most of the older generation of geologists such as Jovan Žujović, Sava Urošević, Jovan Cvijić, and others after successfully completing diplomatic missions, returned to the country and started to gather younger colleagues who graduated abroad. They worked via the regular monthly sessions of SGS (every 10th day of the month) and regular activity at the Geological Survey of the University of Belgrade (LUKOVIĆ, 1954). The victorious energy and enthusiasm was based on the heroic fight during the War and the huge human and material sacrifices gave additional motivation and faith that the geological profession and science will progress in the years to come (GRUBIĆ, 1996; RUNDIĆ et al., 2016).

SGS officially renewed its work with the 178th session on January 10, 1920 (LUKOVIĆ, 1954). Given the fact that the first generations of educated geologists in Serbia were decimated during the war years, the new young geologists immediately joined the work of the SGS (RUNDIĆ et al., 2016). Older ones, led by the president of SGS, Academician and professor J. Žujović were aware that a new stage in the development of Serbian geology would begin, and were determined to reorganize the Society with the help of younger colleagues eager for affirmation. A solemn gathering on 30 years of existence and work

of SGS, at which the founder and long-time president of the Society Jovan Žujović spoke, was held on February 10, 1921. He said: "... We have reason to be completely satisfied (with SGS). It kept us together, maintained the unity and solidarity among us, and sometimes served to divide the labour among us in a useful way. Without the Society, the sum of our work would have been smaller. That is why I say: *Long live the Serbian Geological Society*" (RUNDIĆ & STEVANOVIĆ, 2017).

At the ceremony, Žujović got a special geological hammer with engraving and signatures of all the members of SGS (LUKOVIĆ, 1954; RUNDIĆ et al., 2016).

Academician Jovan Žujović

Jovan M. Žujović (1856–1936), was one of the most prominent citizens at the end of XIX and at the beginning of XX century (GRUBIĆ, 1996; RUNDIĆ, 2010). He finished Natural Science and Mathematics Section of the Great School in Belgrade (1877) and graduated from the Faculty of Sciences, Natural History Section in Paris, France. At the same time, he studied at the anthropological school in Paris. As the first professional geologist in Serbia, he was elected in 1880 as an assistant at the Chair of Mineralogy and Geology of the Great School in Belgrade (GRUBIĆ, 1996). Many decades we celebrate this event as the beginning of the modern geological school in Serbia. In 1883 he became a full professor at the Great School. In a period up to 1900, he produced a geological map of Serbia and wrote a few basic textbooks for geology (RUNDIĆ et al., 2016). His most important works and books have been printed such as the *Geologische Uebersicht des Koenigreiches Serbia* (1886, Wien), *Petrographic mineralogy* (1887), *Petrography I–III* (1889, 1895), *Fundamentals of Geology of the Kingdom of Serbia* (1889), *Sur les roches éruptives de la Serbie* (1893, Paris), *Sur les terrains sédimentaires de la Serbie* (1893, Paris), *Geology of Serbia I–II* (1893, 1900).

He founded a few important institutions such as the Geological Survey of Great School (1889), Serbian Geological Society (1891) and the first geological journal in Serbia named "*Geological Annales of the Balkan Peninsula*" (1888) as well. He was one of

the initiators and founders of the Natural History Museum in Belgrade (GRUBIĆ, 1996). He introduced *Agrogeology* course at the Faculty of Agriculture, and helped its foundation. He taught *Applied Geology* at the Faculty of Engineering until the First World War. His scientific papers were published in many international and national publications (RUNDIĆ et al., 2016). During the establishment of the Serbian Royal Academy (SRA, 1887), among the first sixteen members of the SRA, Jovan Žujović was the youngest one and he was appointed as secretary of the Academy. Twenty-eight years later, he was elected as President of the Serbian Royal Academy (1915–1921) (RUNDIĆ et al., 2016). In the meantime, he was elected into the Hungarian Academy of Science (1894) together with academician Ljubomir Klerić, a mining engineer and one of the first member of SGS (RUNDIĆ, 2020). Interestingly, it should be emphasized that in the same year, Nikola Tesla, the Serbian American and famous world-renown inventor, was admitted to the Serbian Royal Academy on Klerić's proposal.

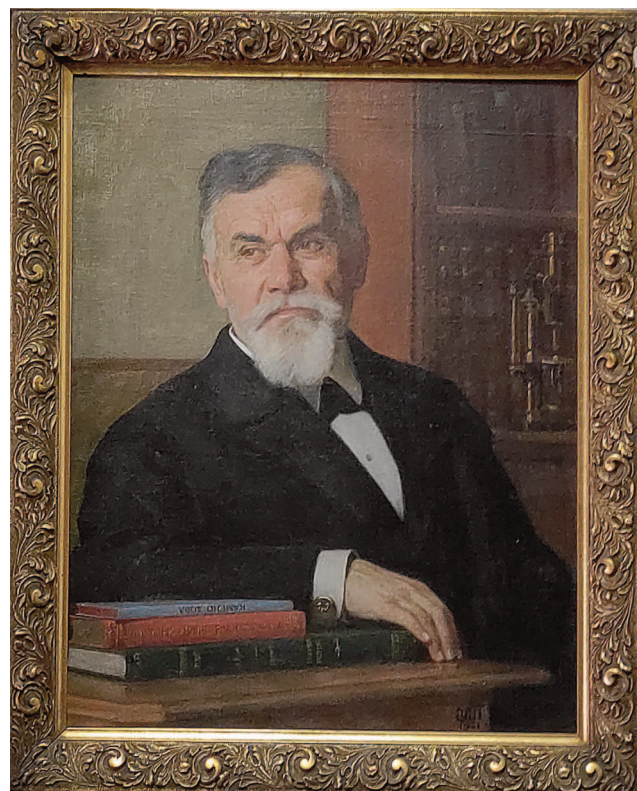


Fig. 1. The famous academic portrait of Jovan Žujović was painted by UROŠ PREDIĆ (oil on canvas, 1921). The painting decorates the Memorial Room of Geology, Kamenička 6.

J. Žujović was a member of the Senate (1901) and a Member of Parliament (1903–1912). He was Minister of Education and Religious Affairs for two terms (1905 and 1909–1910) and Minister for Foreign Affairs of Serbia (second half of 1905). At time of founding of the University of Belgrade in 1905 he was appointed a full professor again, one of the first eight who elected the rest of teaching staff of the University. He held a speech on behalf of the Serbian Royal Academy during the opening ceremony of the University. During the Great War, he was a special emissary of the Serbian government in Paris with the mission of organizing the Serbian schools for refugee pupils and collecting aid (GRUBIĆ, 1996; RUNDIĆ et al., 2016).

The Geological Hammer of Jovan Žujović

The Memorial Room of Geology was formed few years after the Geological Survey of the University of Belgrade was moved from the University building to a new building at Kamenička 6 (1952) and represents an important contribution to preserving the identity of the geological school (LUKOVIĆ, 1954; RUNDIĆ et al., 2016). The Room has very old, but also very valuable elements of heritage, such as old cabinets, desks and chairs, photographs, books, notebooks, decorations, the first microscope, the first petrological and paleontological thin-sections, old hammers, and so forth (Fig. 2). Among many exponents, a working desk of Josif Pančić, a medical doctor and naturalist who in 1853 became the first

professor of natural sciences at the Lyceum (later at the Great School) takes a particular place. Pančić gave the position of lecturer in geology to Žujović. Both of them have special collections of personal things in the Memorial Room. For example, among the collection of Žujović's domestic and foreign orders, the French Legion of Honour stands out.

The Žujović's hammer consists of two-pieces: the steel head and wooden handle reinforced at the ends (Fig. 3a–b). Both pieces are specific in relation to other similar hammers because they have a specially written dedication. Both sides of the head have engraved inscriptions (Fig. 3c–j). On one side, in the central part of the head, in small written Cyrillic letters, it is written in three lines: "The founder of Serbian Geology – Jovan M. Žujović – Grateful students". In the front, it is engraved "1880" (the year of the founding of Chair for Mineralogy & Geology at Great School, Belgrade) and on the posterior end of the head it says "1921." On the other side of the hammer head, in the middle, also in Cyrillic letters, are engraved in three rows: "To President – of the Serbian Geological Society – Members". In the back part is engraved: "1891" (year of the founding of the SGS) and close to the blade is inscribed: "1921".

The length of the steel head is 12.5 centimetres, the maximum height of the head is at the posterior impact end is 2.5 centimetres. The maximum width of the head is in the middle (3.5 cm) where it has an elliptical shape (see Fig. 3f, k). The width of the chisel as well as posterior, striking end is 2.5 centimetres. In the middle of the head, where a wooden handle is inserted, there is a steel reinforcement in



Fig. 2. The Memorial Room of Geology, Kamenička Str. 6 (left), has the three old hammers as a part of exhibited exponents (right).



Fig. 3. Geological hammer of Jovan Žujović from 1921. View of the hammer (a–b) and engraved inscriptions on both sides of the hammer head (c–j) and on head cover (k). The reinforced posterior part of handle (l) and small, metal patch with name of one of SGS member (m).

the form of a head cover that has engraved initials “JMŽ”, written in capital Cyrillic letters (Fig. 3k). The wooden handle is about 60 cm long, made of oak wood (Fig. 3a, b; Fig. 4). The diameter of the handle is 2.2 centimetres. It is reinforced in the part towards the head with two metal strips 13.5 centimetres long and 1.5 centimetres wide. The posterior end is reinforced with a metal cylinder that has a sharp pointed tip at the very end of the total length of 7.5 centimetres (Fig. 3l). Along the entire length of the handle, on both sides, there are Cyrillic signatures of the SGS members. Many of them are important personalities of Serbian science and geology of that time. It is especially important to point out the signatures of Vladimir Laskarev, a well-known Russian and Serbian geologist (founder of the term Paratethys, 1924) and a prominent member of the SGS (Fig. 4a). In addition to him, there are the names of several other prominent members of SGS, professors at the University of Belgrade and curators of the Museum of Natural History in Belgrade (Sava Urošević, Svetolik Radovanović, Petar S. Pavlović, Vladimir Petković – see Fig. 4b–d), Svetolik Stevanović, Jelenko Mihailović, Dimitrije Antula) and Aleksa Stanojević, Branislav Petronijević, Milan T. Luković, Marko Leko, Branko Dimitrijević, Jovan Tomić, Jovan Dinić, Bor. T. Mladenović, Djordje Zloković, Petar St. Pavlović, Sima Trajanović, Stevan Nikolić, Nikola Rakić, Svetozar Zorić, Čedomir Petrović (Fig. 4e–j), a few more whose names are difficult to identify (? Sima Lozanić, ? Popović, ? Andrijašević, ? Marinković, etc. Finally, there are several names that are written extremely vaguely or poorly visible, and it is not possible to identify who they are. Near the head of hammer, next to the metal strip, there is a small, thin metal clasp with the name of A. I. Ilić, a mining engineer.

Some remarks

It is unbelievable, but such a simple tool like a geological hammer has played a primary role in obtaining geological data for centuries. Practically, it represents a part of the geologist's body i.e. extension of the hand as the KLEMUR (2011) wrote. Numerous historical records testify to how much the

hammer meant in the early stages of the development of geology in Europe. For example, SAKULA (1990) wrote that the famous naturalists of the second half of the 18th and the first half of the 19th century such as James Hutton MD (1726–1797), Abraham Gottlob Werner (1748–1817), William Smith (1769–1839), Karl Alfred von Zittel (1839–1904) viewed as “gentlemen with hammers”, similarly as a lot of medical geologists (see SAKULA, 1990). When you break a part of the fresh rock with a hammer, in addition to breaking the rock itself, you can also learn a lot about the nature of the rock. The rock pattern speaks of hardness and fragility, scratch, grain size, composition, dominant minerals, smell (sometimes taste), and even its chemistry (PALMER, 2016).

Indeed, the geological hammer is the key tool of all times for the geologist. Without a geological hammer the job cannot be done well. Modern and world-renown one-piece steel geological hammers made by Eastwing Manufacturing Co. (USA) have the pointed tip or chisel-edge. For shock reduction they have a nylon-vinyl rubber grip that reduces impact vibration up to 60–70%. These tools have great balance and are double tempered for additional strength. Mostly, they have 14 to 22 oz weight (ca. 400–625 gram).

Whatever, a primary role of the geological hammer is the same as during Žujović's time.

Conclusions

The long and interesting geological history, as a part of the overall natural, cultural and historical heritage of Serbia, has left numerous marks. Among them, there are extremely old and valuable collections and exhibits that are kept with great reverence (e.g. Memorial Room of Geology). One such example is highlighted here and torn from the oblivion of the past.

The geological hammer of Academician Jovan Žujović, the most prominent person in Serbian geology for over fifty years (1880–1936), testifies to the deep respect to the founder of the Serbian geological school. Our admiration for the members of the Society who gifted the hammer to Žujović, and



Fig. 4. The hammer handle with Cyrillic signatures of the SGS members. Together with Žujović, the prominent members such as VLADIMIR LASKAREV, P. S. PAVLOVIĆ, S. UROŠEVIĆ, S. RADOVANOVIĆ, and V. PETKOVIĆ (a-d) were the leaders of the post-Great War generation of geologists in Serbia. Other pictures (e-j) show some of the other SGS members' signatures.

later left to younger generations to keep and commemorate is deserved.

The geological hammers of that time did not differ much in form and method of production (two-pieces, consisted of wooden handle and the steel head). However, the Žujović's hammer is specific by its inscription, message and the historical importance it has. On both sides of the steel head it has engraved dedication in Cyrillic letters and, on the wooden handle there are the signatures of all the members of SGS, including the prominent names of European and Serbian geology, such as Vladimir Laskarev.

It is of great symbolism for this historical note to be published in this journal. Namely, the Geological Annales of Balkan Peninsula journal was founded in 1888 by Jovan Žujović. The author had the privilege and real pleasure to "peek" into the rich treasury of our movable geological heritage.

Acknowledgements

The author thanks the heads of the Department of Regional Geology and the Department of Paleontology (University of Belgrade, Faculty of Mining and Geology) for access to the Memorial Room of Geology (Kamenička Str. 6, Belgrade). Special gratitudes go to the reviewers Dr. W. SCHWARZHANS (NHM of Denmark, Copenhagen) and Dr. E. TARASSOVA (BAS, Sofia) whose comments improved this paper.

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Резиме

Сведок историје: сто година стар геолошки чекић Јована Жујовића

Дуга и занимљива геолошка историја, као део укупног природног, културног и историјског наслеђа Србије, оставила је бројне трагове. Међу њима су изузетно старе и вредне музејске и факултетске збирке и експонати који се чувају са великим пијететом. Овде је истакнут један такав пример и отргнут од заборавља прошлости.

Геолошки чекић Академика Јована М. Жујовића, највеће личности српске геологије дуже од

пола века (1880–1936), сведочи о дубоком поштовању према оснивачу српске геолошке школе. Дивљење заслужују и чланови Српског геолошког друштва који су тај чекић даровали и оставили млађим генерацијама да га са пијететом чувају као наше геонаслеђе.

Сто година стар чекић академика и професора геологије Јована М. Жујовића, изграђен је из два дела: челичне главе и дрвене дршке ојачане на крају (Сл. 3а, б). Оба дела су специфична у односу на друге сличне чекиће јер имају посебно написану посвету. На обе стране главе чекића угравиран су ћирилични натписи писаним словима (Сл. 3ц–ј). На једној страни, у централном делу главе, малим словима ћирилице, исписано је у три реда: „Оснивачу српске геологије – Јовану М. Жујовићу – Захвални студенти“. Спреда је угравирано „1880“ (година оснивања Катедре за минералогiju и геологију на Великој школи у Београду, прим. аут.), а на другом крају главе пише „1921.“ На другој страни главе чекића, у средини, истим ћириличним словима, урезано је у три реда: „Председнику – Српског геолошког друштва – Чланови“. На задњем делу главе, угравирано је: „1891“ (година оснивања СГД, прим. аут.) а на предњем делу главе где је сечиво тј. длето, исписано је: „1921“.

Чекић је дугачак 60 центиметара и тежак око 800 грама. Дужина челичне главе је 12,5 центиметара, максимална висина главе јеу задњем, ударном крају и износи 2,5 центиметра. Максимална ширина главе (3,5 cm) је у средини где има елиптични облик. Ширина длета главе као и задњег, ударног краја је 2,5 центиметара. На средини главе, где је уметнута дрвена дршка, налази се челична, овална плочица у форми поклопца главе која има урезане иницијале „МЖ“, исписане великим словима. Дрвена дршка дуга око 60 cm израђена је од храстовог дрвета. Промер дршке је 2,2 центиметра. У делу према глави је ојачана са две металне траке дужине 13,5 и ширине 1,5 центиметара. Задњи крај ојачан је металним цилиндром који на самом крају има оштар шиљати врх укупне дужине 7,5 центиметара.

Са обе стране, по целој дужини дршке, а идући од краја дршке према глави чекића, налазе се ћирилична имена чланова СГД који су се потпи-

сали Жујовићу у част (Сл. 4а–ј). Многи од њих били су важне личности српске науке и геологије тога доба. Посебно је важно истаћи потпис Владимира Ласкарева, познатог руског и српског геолога (творца појма *Паратетис*, 1924) и истакнутог члана Друштва. Поред њега, ту су и имена још неколико истакнутих чланова СГД, професора Универзитета у Београду, кустоса Природњачког музеја, Управника Сеизмолошког завода, државних геолога и др. међу којима су Светолик Радовановић, Петар С. Павловић, Сава Урошевић, Владимир Петковић, Светолик Стевановић, Јеленко Михаиловић и Димитрије Антула. Од осталих чланова Друштва, видљиви су потписи: Алекса Станојевић, Бранислав Петронијевић, Милан Т. Луковић, Марко Леко, Бранко Димитријевић, Јован Томић, Јован Динић, Бор. Т. Младеновић, Ђорђе Злоковић, Сима Трајановић, Стеван Николић, Никола Ракић, Светозар Зорић, Чедомир Петровић. Неколицини чланова СГД имена је тешко распознати и идентификовати (? Сима Лозанић, ? Поповић, ? Андријашевић, ? Маринковић итд.). Коначно, постоји неколико имена која су написана крајње ситно или нејасно те није могуће рећи о коме се ради. Близу главе чекића, поред металне траке, закуцана је мала, уска метална копча са изгравираним именом А.И. Илић, рударски инжењер.

Скоро невероватно звучи да је тако једноставан алат попут чекића вековима играо примарну улогу у добијању геолошких података. Стога се заиста може рећи да геолошки чекић није само оруђе, већ и најстарији основни инструмент у геологији (PALMER, 2016). Практично он представља део тела геолога, тј. продужетак шаке како је написала КЛЕМUR (2011). Када чекићем разбијете део свеже стене, поред разбијања саме стене, можете много научити и о природи те стене. Узорак стена говори о тврдоћи, огребу, величини зрна, саставу, доминантним минералима, мирису (понекад и укусу, нпр. код туфа), па чак и његовој хемији (PALMER, 2016). Бројни историјски записи сведоче о томе колико је чекић значао у раним фазама развоја геологије. На пример, SAKULA (1990) наводи да су најпознатије природњаци и геолози друге половине 18. и прве половине 19. века, попут Ј. HUTTON (1726–1797), А. WERNER (1748–1817), W. SMITH

(1769–1839), C. VON ZITTEL (1839–1904) и многи други тзв. „медицински геолози“ били права „господа са чекићима“.

Велика је симболика што је ова историјска белешка о 100 година старом чекићу Јована Жујовића написана и публикована баш у овом часопису (Геолошке анале Балканскога полу-

стрва је још 1888. године основао Јован Жујовић). Аутор је имао привилегију и право задовољство да „завири“ у богату ризницу нашег покретног геолошког наслеђа.

Manuscript received June 07, 2021

Revised manuscript accepted June 26, 2021