Lives and work
of the Serbian scientists

СРПСКА АКАДЕМИЈА НАУКА И УМЕТНОСТИ

БИОГРАФИЈЕ И БИБЛИОГРАФИЈЕ

Књиге I–X, Сажеци

II ОДЕЉЕЊЕ

ОДБОР ЗА ПРОУЧАВАЊЕ ЖИВОТА И РАДА НАУЧНИКА У СРБИЈИ
И НАУЧНИКА СРПСКОГ ПОРЕКЛА

Књига сажетака

Живот и дело српских научника

Уредници специјалног издања

академици
ВЛАДАН Д. ЂОРЂЕВИЋ
ДРАГОМИР ВИТОРОВИЋ
ДРАГОСЛАВ МАРИНКОВИЋ

БЕОГРАД
2006

SERBIAN ACADEMY OF SCIENCES AND ARTS

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Volumes I–X, Abstracts

II SECTION

COMMITTEE FOR RESEARCH INTO THE LIVES AND WORK OF THE SCIENTISTS IN SERBIA AND SCIENTISTS OF SERBIAN ORIGIN

Book of Abstracts

Lives and work of the Serbian scientists

Editors of the special edition

Academicians
VLADAN D. DJORDJEVIĆ
DRAGOMIR VITOROVIĆ
DRAGOSLAV MARINKOVIĆ

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2006

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PREFACE

Lives and work of the Serbian scientists is an edition of the Serbian Academy of Sciences and Arts (Committee for research into the lives and work of the scientists in Serbia and scientists of Serbian origin) the first book of which was published in 1996. Over the past ten years 10 books have been issued. Presented on more than 5000 pages are life stories and working biographies of 125 scientists in Serbia and those of Serbian origin who will be remembered in the history of Serbian science for their achievements in natural, mathematical, technical and medical sciences. The editor of the first 8 books, as well as the founder of the edition and the first Committee President, was academician Miloje R. Sarić, whereas academician Vladan Djordjević, who is also the current President of the Committee, edited the last two books.

Following the publication of Book 10 in 2005, the Committee decided to produce a special edition which would comprise only English summaries of previously published 125 biographies and portraits of related scientists. Concise and authentic accounts of lives and work of 125 Serbian scientists, who lived and worked in different periods throughout Serbian history, are now available in English. The Committee believes that publishing such a book would increase interest of both domestic and foreign readership in other books from this edition which are already out, but also in those awaiting publishing.

This special edition is now ready for the readers. Previously written English summaries have been revised, and mistakes rectified where necessary. A portrait of Petar Živković (1847–1923), missing from the first book, has been included in this edition. Four statistically relevant appendixes: the *Index of Scientists* organized by their specialist areas, the *Contents* specifying all previously published books, the *Index of Scientists* listed according to their years of birth, and the *Register of Authors* who so far have produced articles about scientists, have also been added.

We wish to acknowledge our appreciation to all the authors, whose names have been listed in the *Register*, in particular to the most prolific ones among them: Aleksandar Grbić, Snežana Bojović, Katica Stevanović-Hendrih and Vidojko Jović. We also extend our gratitude to Vesna Novaković, the English language editor, who has made every effort to make the language of this book as accurate as and consistent as possible.

November 2006

Editors of the special edition

ПРЕДГОВОР

„Живот и дело српских научника“ је едиција Српске академије наука и уметности (Одбор за проучавање живота и рада научника у Србији и научника српског порекла) чија је прва књига објављена 1996. године. У протеклом десетогодишњем периоду издато је 10 књига. У њима су, на више од 5000 страница, обрађене животне и радне биографије 125 српских научника и научника српског порекла у области егзактних, природно-математичких, техничких и медицинских наука, који су по резултатима свога рада заслужили трајно место у историји српске науке. Уредник првих осам књига био је академик Милоје Сарић, покретач едиције и први председник Одбора, а последње две академик Владан Ђорђевић, данашњи председник Одбора за проучавање живота и рада научника у Србији.

По изласку из штампе 10. књиге, 2005. године, Одбор је донео одлуку да се објави једна посебна књига едиције, која би садржавала само изводе на енглеском језику, раније објављене уз 125 поменутих биографија, као и портрете одговарајућих научника. На тај начин би се на енглеском језику сажето, а веродостојно, приказао животни пут и резултати рада 125 српских научника који су стварали у разним периодима историје Србије. Одбор је сматрао да би се штампањем овакве посебне књиге повећало интересовање за већ објављене књиге едиције, а и за оне чије издавање предстоји, и то како код читалаца и земљи, тако и код читалаца у свету.

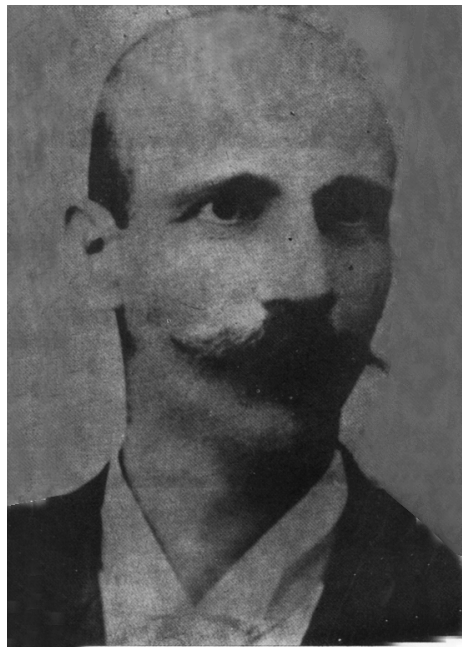
То посебно издање се сада налази пред очима читалаца. За њега су раније објављени изводи на енглеском језику редиговани у случајевима када је то било неопходно и исправљене су уочене штампарске грешке. Додат је и портрет Петра Живковића (1847–1923), који је недостајао у првој књизи едиције. За књигу су припремљена и четири за статистику корисна додатка, и то: Списак научника по областима рада, Садржај сва-

ке од претходно издатих књига, Списак научника по годинама рођења и Регистар аутора који су до сада писали чланке о научницима.

Сматрамо својом пријатном дужношћу да и овом приликом захвалимо свим ауторима до сада објављених чланака, чија су имена наведена у једном од поменутих додатака, а посебно оним најплоднијим од њих: Александру Грубићу, Снежани Бојовић, Катици Стевановић-Хедрих и Видојку Јовићу. Своју захвалност дугујемо и г-ђи Весни Новаковић, лектору енглеског језика, која је исправила не мали број штампарских грешака и уложила велики труд да изводи буду језички уједначени.

Новембра 2006. године

Уредници посебног издања



Lujo ADAMOVIĆ
(1864–1935)

Dr. Lujo Adamović was born on July 31, 1864, in Rovinj, where his father Vicko, a teacher, historian and writer from Dubrovnik was on a brief term of service. His father was a pupil of Vuk Karadžić. His father took him to Dubrovnik where he grew up and went to school.

He was educated in Vienna and Belgrade, being one of the students from the last generation taught by Josif Pančić. In 1889 he went to Serbia where he worked as a high school teacher in Belgrade, Zaječar, Pirot, Vranje and Gornji Milanovac. He taught botany, geology, German and French.

Lujo Adamović had a good mastery of French, German and Italian, particularly of the German language in which he could write easily.

He was professor of botany at Belgrade University until 1905. Between 1906 and 1914 he was *Private senior lecturer* of biogeography at Vienna.

Political events in the Balkans forced him to leave for Montenegro where he obtained a position, thanks to Montenegrin Minister of Education, at the Ministry.

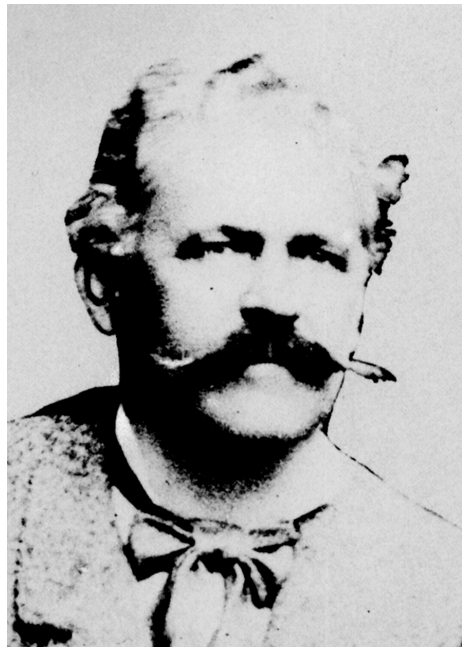
Adamović had five children, three daughters and two sons, who had been taken from Serbia to a prison camp in Hungary. He applied for a leave absence in order to look for his children in the prison camps. With the Minister's approval he crossed again into Serbia where he remained until 1918.

Apart from holding lectures at University, he was director of Belgrade University's Botanical Gardens from 1901 to 1905, and again in 1915 and 1916. He was Austria's Civil Administrator for Agriculture in Dalmatia.

Upon the application of the latest criteria for the description of species, a *bona fide* status of the species described by Lujo Adamović was preserved in 13 species. A number of species (13) were categorized, according to these criteria, as subspecies and a number of species as varieties and forms.

Out of respect for this great scientist and expert in plant systematization, five plants have been named after him.

Author: *Tatić, Budislav*



Konstantin–KOSTA ALKOVIĆ (1836–1909)

Kosta Alković was an honorary member of the Academy. His professional career developed mainly within Belgrade College where he worked as a teacher. At the beginning of his career, he gave up the idea of the original approach towards science for the benefit of being "a good professor of physics" which earned him the position of Chair of the Physics Department. He was an excellent teacher and pedagogue whose well-attended lectures were clear and easy to understand. He was very dedicated to his students and bequeathed his property to the University Student's Fund as a sign of his devotion. He was very friendly with younger colleagues who were starting their careers at Belgrade College. His spirit of goodwill and loyalty made the atmosphere at the College very

enjoyable. We, his former students and later on his colleagues, will always keep Mr. Kosta Alković in a pleasant memory.

This is a quote from the speech presented by the academician J. M. Žujović, an honorary member of the Serbian Royal Academy, at the Academy's Annual Assembly meeting on February 22, 1910.

Kosta Alković was born in 1836, in Belgrade, where he died in 1909. He was a student at the Lyceum, at the Natural Sciences Department. The Lyceum correspondence reveals that in 1855 he was awarded a silver medal for writing a *paper about atmosphere*. He studied at the Vienna Polytechnic, displaying preference for mathematics, physics, mechanical engineering and practical geometry which he chose as his major subjects.

After finishing his studies in 1859, he returned from Vienna to Belgrade and first took the post of an assistant and then of a physics teacher at Belgrade College.

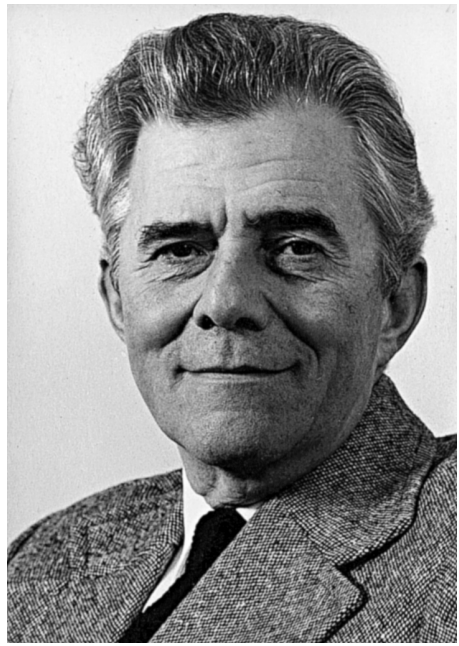
He was a teacher of physics and mechanical engineering at the Lyceum and Belgrade College, Dean of the Technical Department of Belgrade College (1868), Rector of Belgrade College (1885–86), a full member of the Serbian Learned Society, an honorary member of the Serbian Royal Academy, and Minister of Civil Engineering (1891–93). Beside his professional and pedagogical activities at College, he was professionally engaged with a number of other educational institutions.

Towards the end of the last century, interest in astronomy intensified and Prof. Alković chose two of his students and fully supported their astronomy pursuits. Thanks to one of them, Belgrade College obtained an astronomical and meteorological observatory.

Kosta Alković was an active member of many examination boards (professorial examination, state exams, and secondary schools final exams) and of several expert and professional teams, the latter being established by the Serbian Government who needed studies and projects to solve civil engineering problems. Special emphasis should be given to his engagements with commissions set up to explore and improve railroad constructions and printing equipment. Article 38 of the Peace Treaty defined the rights and duties of Serbia concerning construction of railroads and the 1880 Vienna Railroad Convention obliged Serbia to finish the construction works of the Belgrade - Niš railroad. Prof. Alković was among three engineers that the Government of Serbia greatly relied on.

He was the founder of the Physics Department at Belgrade College. His contribution to teaching physics there deserves highest respect.

Author: *Stevanović-Hedrih, Katica*



Slobodan ALJANČIĆ (1922–1993)

Slobodan Aljančić, professor at the Faculty of Sciences and Mathematics in Belgrade for many years, and a full member of the Serbian Academy of Sciences and Arts from the age of 46, was one of the most outstanding mathematicians and teachers in Serbia in the second half of the 20th century, and also a highly respected and loved man.

He was born in Belgrade, on March 12, 1922. His father, Zdenko Aljančić, was of Slovenian origin, and his mother Bisenija came from a Belgrade family. He finished primary and secondary school in Belgrade. In 1940, he started his studies of civil engineering. After World War II he continued his education at the Faculty of Philosophy, the Mathematics Department from which he graduated in 1947.

Aljančić started research work at the Faculty already, and published his first paper in 1948. After graduation he became a secondary school teacher, and also a part-time assistant at the Faculty of Natural Sciences until 1951, when he obtained a permanent position of an assistant at the Faculty. Continuing his research, in 1953 he obtained his Ph.D. title from the Academy of Sciences defending his thesis *On Asymptotic Expansions of A-Summable Linear Functionals.* His further scientific development and his university career were rather quick. He became assistant professor in 1954, associate professor in 1959 and full professor in 1968. He was elected a corresponding member of the Serbian Academy of Sciences and Arts in 1961, and a full member in 1968.

Almost from the very beginning of his scientific career, Aljančić was part of the circle of students and associates of the great Serbian mathematician Jovan Karamata, working in particular with Miodrag Tomić and Ranko Bojanić. He studied, alone or with the group, primarily summability of trigonometric series and regularly varying functions, and before that he worked on asymptotic series and approximation theory. While dealing with them he closely worked with the leading expert in this area, Jacques Favard, thanks to whom he was on sabbatical in Paris during the 1957/58 school year. The friendship with Favard continued in the subsequent years. Apart from his stay in Paris, Aljančić also spent three months in the United States, in 1971 and attended several domestic and foreign conferences and congresses. His teaching career was also remarscable and he, among other things, published two successful textbooks. One of them, the *Introduction to Real and Functional Analysis* was used by numerous generations of students.

During the last two decades of his life, Aljančić suffered from a serious heart condition but due to discipline and his perseverance he successfully coped with it. Regrettably, he did not recover from a malignant disease which struck him later on. He died on March 19, 1993.

The work of Aljančić can be classified into the following five areas:

I. The theory of asymptotic series,
II. Approximation theory,
III. Trigonometric series,
IV. Summability,
V. Regularly varying functions.

I Asymptotic series was introduced by Poincaré and Stieltjes at the end of the 19th century, and later on this notion was generalized in several ways. The first papers of Aljančić partially belong to this area, and the dissertation mentioned above was entirely dedicated to problems from

this area. In other articles, Aljančić obtained several new asymptotic expansions.

II The approximation theory deals with estimation of the elements of a space of real functions by certain classes of trigonometric polynomials and the results consist mostly of direct and inverse theorems, equivalence theorems, and saturation theorems. Aljančić started working on this theory in 1957 and, as already mentioned, he worked with Favard. In his works dealing with this theory, he studied various approximation procedures, especially in connection with saturation classes and orders of approximation for saturations.

III In the area of trigonometric series Aljančić, alone or together with Bojanić and Tomić, used slowly varying functions to generalize, among others, theorems concerned with the asymptotic behavior of sine and cosine series and with the relationship between the integrability of some functions and convergence of the corresponding series. He also studied certain problems in connection with Fourier series, transformed by multiplication of their given coefficients.

IV The study of summability has a long and abundant tradition in Serbia. Before and after World War II, Karamata and many of his followers conducted through research of these problems, which resulted in the so-called direct (*Abelian*), inverse (*Tauberian*) and Mercerian theorems. Aljančić obtained important results dealing with summability, mainly in relation to the Mercerian theorem.

V Aljančić's works that dealt with regular variation (regularly varying functions) are among his most important works. Slowly (and regularly) varying functions were introduced by Karamata in the early 1930s. Karamata set the foundation of this theory and determined its various applications. Later on, several authors, from Serbia and abroad, further developed this theory and its various applications. Together with Bojanić and Tomić, with Karamata, or alone, Aljančić applied these functions to the investigation of the behavior of sums of trigonometric series, to the problem of integrability of these sums and to a problem concerning Frullani integral. Two of his articles deal with the theory of regular variation in a broad sense. The first one, worked on together with Bojanić and Tomić, contains a systematic study of the so-called slowly varying functions with a remainder term, while the second one, which he worked on with D. Arandjelović, proposes the theory of the so-called O-regularly varying functions. These functions were considered by Karamata and Avakumović already in the 1930s, but Aljančić and Arandjelović went much further in their investigations and also found some applications.

There is much evidence in existence which proves that many years of teaching of Slobodan Aljančić were as important as his scientific achievements. The quality of his lectures and standard of his teaching deserve a special mention. Besides, he wrote several very good textbooks, but only had two published. He was mentor to several Ph.D. and masters candidates, who provided his students with indispensable help. He is also responsible, and respected as well, for introducing functional analysis in Serbia.

As a man and colleague, Prof. Aljančić possessed special kindness and warmth and always behaved calmly and considerately towards others.

Slobodan Aljančić, the academician and professor, was a central link, or the so-called bridge between the generation of Serbian mathematicians of the past on the one hand; whose leading figures were Mihailo Petrović, Bogdan Gavrilović, Nikolaj Saltikov, Tadija Pejović, Jovan Karamata, Miloš Radojčić, Radivoje Kašanin, Vojislav Avakumović and Dragoljub Marković, and the generation of mathematicians of the present era on the other.

Authors: *Adamović, Dušan; Arandjelović, Dragan*

Tatomir P. ANDJELIĆ
(1903–1993)

The cover page of the university non-standard textbook – monograph *Mechanics of Shells and Plates* published in 1975, co-authored by academician Andjelić and P. M. Ogibalov, gives a brief outline of Andjelić's scientific biography:

Dr Tatomir P. Andjelić – professor at the Faculty of Natural Sciences and Mathematics, University of Belgrade, full member of the Serbian Academy of Sciences and Arts and International Astronautics Academy in Paris.

T. P. Andjelić studied mathematics, physics and astronomy which lead to his formation as a theoretician of mechanics. He published over 70 works, among which are 9 university textbooks. He addressed the

problems of rational mechanics, Reiman geometry, numerical methods in mathematics, and also historical and philosophical problems of mechanics. He was very active in scientific societies, especially engaged in disseminating scientific knowledge. T. P. Andjelić was Dean of the Faculty of Natural Sciences and Mathematics and now is Director of the SR Serbia's Institute of Mathematics. He was decorated with the Order of Labour with the Red Flag and the Order of Merits with the Gold Star.

The Necrology written by the corresponding member Božidar D. Vujanović read: *Prof. Dr. Tatomir P. Andjelić passed away on August 7, 1993. He was a full member of the Serbian Academy of Sciences and Arts and a full professor at the Faculty of Natural Sciences and Mathematics ... Prof. Andjelić was spiritually rich, highly educated and a very talented person, whose work at University left deep traces on scientific audience and the Serbian Academy of Sciences and Arts, highly valued in the Yugoslav and foreign scientific circles... It is rightly thought of Prof. Andjelić as the founder of the Belgrade School of Mechanics. Many generations of students will remember him as a brilliant professor, reliable director of scientific projects, and a wise adviser on doctoral dissertations and studies…*

Only two years before, on January 18,1991, during the ceremonial opening of a scientific meeting held in honor of academician Tatomir P. Andjelić, the academician Aleksandar Despić, in his welcome-address on behalf of the Serbian Academy, expressed the honour and pleasure of opening the meeting by saying: *This honour and pleasure is a great* one due to *the fact that I myself belong to the pleiad of people to whom, over 50 years ago, Prof. Andjelić passed the earliest knowledge of the power and possibilities of mathematics and mathematical way of thinking. At the very beginning of my secondary schooling at the Second Belgrade Grammar School for Boys, the first one to describe to me the term "space" was the young teacher substitute Tatomir Andjelić, straight as a pine tree, and as high as a tower to us pupils.*

That first encounter, and the two-year period of meeting Prof. Andjelić, will remain in my memory for ever.

Prof. Veljko Vujičić, emphasizing the impact of Tatomir Andjelić's study on the motion of non-holonomic system in fluid, and the importance of scientific and educational activity for the development of our school of mechanics, at the same meeting said:... *I consider it is necessary to emphasize that, to some extent, the role of the Suslov school is overstressed with us, and that distinguished place that belongs to T. P. Andjelić concerning the development of our school of mechanics is not sufficiently valued. Success of our analytical mechanics and continuum mechanics*

primarily are based on solid mathematical foundations of the Belgrade school, in majority on functional and tensor analysis and differential geometry. Considerable value is to be found in books of Prof. Andjelić dealing with the problems of matrix, vector and tensor calculus.

Academician Vladan Djordjević said, at a commemorative meeting, that Prof. Andjelić had a long and very fruitful life. His health served him well, enabling him to be active for a long time and to write his last book *Introduction to Astrodynamics* at the age of 80. Adding that Prof. Andjelić was a highly respected and admired person, surrounded with love of his family and his associates, Djordjević finished his exposé quoting Prof. Andjelić's words: *In nature, as in the world around us, everything changes. In the transformation - development - decline process nothing occurs without something already in existence which causes new things to appear. Prof. Andjelić is no longer among us, but many faculties of natural sciences and mathematics, technical faculties and scientific institutes in our country, and a number of scientists that are engaged in theoretical or applied mechanics, originate directly of indirectly from his school of mechanics,* concluded his speech Djordjević.

Author: *Stevanović-Hedrih, Katica*

Dimitrije ANTULA (1870–1924)

Dimitrije Antula, the second Serb with a Ph. D. in geology, was born in Belgrade, on November 22, 1870 into a reputable merchant family of the Tzintzar origin. He completed all of his education in Belgrade. He graduated from the Faculty of Philosophy, Department of Natural Sciences and Mathematics, in 1892. He developed particular interest in geological sciences while at university. As a third-year student he was a co-founder of the Serbian Geological Society (1891) and also reported from its first session.

After graduating, Dimitrije Antula studied for his professorship examination while doing field-work in Svrljig and exploring fossilliferous

cretaceous deposits. He took the collected fossils to the Paleontological Institute in Vienna for verification. There he became acquainted with the large collection of cretaceous fossils of H. Abich. He studied this large collection, under Prof. W. Waagen, and used it for his Ph. D. thesis which he defended in 1896. In Belgrade, he successfully passed the professorship exam under Prof. J. Žujović.

On his return to the country, Antula taught at the Third Belgrade Grammar School for Boys. In 1897, he was elected *geologist of the 5th class and the head of the Museum* at the Mining Department of the Ministry of National Economy, and was also engaged in mining and geological research work. For 17 years he studied different mineral occurrences and ore deposits all over Serbia: copper ore of the *Timok andesitic massif,* gold in the Timok region; polymetalic ores of Kučajna; ferrous ore; coal deposits and oil shales.

Thanks to Antula's efforts and high professionalism, the Geological and Mining Museum of the Mining Department acquired a rich collection of mining samples. He organized the Serbian pavilion at the World Exposition in Paris (1900), Liege (1905), Milan (1906) and Turin (1911). The Balkan Exposition in London (1907) brought him the highest praise. He also participated at the 7th, 8th and 9th International Geological Congresses in St. Petersburg, Paris and Vienna respectively.

He was particularly interested in drafting of Serbia's Mining Act. On his own initiative he systematically studied mining legislations of the neighbouring countries. He was subsequently commissioned, together with V. Mišković, to draw up the new Mining Act of Serbia. He accomplished the task with excellent results and it was not a surprise that he was appointed Head of the Mining Department (1914). In 1919, after World War I ended, he was appointed director of the General Mining Department of the Ministry of Forestry and Mining. He managed the post-war mining development in the Kingdom of the Serbs, Croats and Slovenes with great managerial skills and enthusiasm. He held the office until his sudden death on July 17, 1924.

Dimitrije Antula was a very active member of the Serbian Geological Society. For three consecutive years he was elected secretary of the Society. The 9th Congress of Geologists, held in Vienna in 1904, prompted him to organize a geological field trip to Djerdap, after which Serbian geology gained considerable affirmation and the Serbian geological school acquired high international recognition.

Between 1907 and 1922, Prof. Antula was a part-time professor of geology and technical geology at the Civil Engineering Department of Technical Faculty in Belgrade.

Dimitrije Antula published 144 papers; scientific texts, reviews and translations. His major works pertain to the studies of copper ore deposits, gold, iron and coal deposits in Serbia, cretaceous fossilliferous deposits in Svrljig and Donji Milanovac and Serbia's Mining Act. Works that deserve a special mention are his doctoral thesis and review about ore deposits in Serbia. In his dissertation he described 119 fossil forms among which he has determined 24 new species and two new genera (*Inflaster* and *Parahoplites*), included in the contemporary literature and valid to this day. A monograph about ore deposits and an ore deposits map represented a synthesis of all known data on geology and occurrences in Serbia till 1900. The French version of the monograph directly announced to the world the latest discoveries in this field. Both the monograph and the map are being used by scientists nowadays.

Contemporaries remember Antula as an important scientist, a figure of dignified manners and high spirits. Serious, of gentle nature, he is remembered fondly by his colleagues. He did not waste time on insignificant matters, political affairs or party disputes. He was fully devoted to science and the study of geological and mining problems. From his early age everything that he started he finished in a most professional way. His contemporaries wrote: *Antula was irreplaceable* and *His work represents an enormous contribution to the science of geology*.

Antula was one of the most reputable Serbian geologists.

Author: *Grubić, Aleksandar*

Ivan ARNOVLJEVIĆ
(1869–1951)

Ivan Arnovljević was born in Velika Kikinda, on March 7, 1869 and died in Belgrade, on November 9, 1951.

After finishing school in Kikinda and Novi Sad, he received a scholarship from the Matica Srpska. He studied at the Vienna Polytechnic for 1886 to 1892. After he graduated, he worked in Vienna from 1892 to 1910; as a construction engineer with a privately-owned construction bureau first and then in the government service.

Between 1906 and 1910, Ivan Arnovljević had nine treatises published in Austrian and German technical periodicals. In 1910 he was awarded a doctorate from Technical High School in Vienna. He became,

with Milutin Milanovac somewhat earlier, one of Serbia's first doctors of technical sciences. That same year Dr. Ivan Arnovljević was appointed professor of mechanics at the Technical Faculty of Belgrade University. He held the position until May 20, 1939 when he retired but continued teaching kinetics and dynamics until March 27, 1941.

Prof. Dr. Ivan Arnovljević wrote 22 scientific and pedagogical treatises. His works were quoted in 13 foreign and local books, mostly by Austrian and German scientists. His main interest focused on problems concerning stress in steel girders and coupled systems. His pedagogical activities were mostly in connection with the subjects of mechanics, geometry and statics. He personally wrote of all of his books except for one which was coauthored by B. Petronijević.

In 1948 he was elected to the Serbian Academy of Sciences, as corresponding member of the Department of Technical Sciences.

Author: *Naerlović-Veljković, Natalija*

Vojislav G. AVAKUMOVIĆ (1910–1990)

V. G. Avakumović was born on March 12, 1910 in Zemun where his father, Dr. Grigorije (Giga), worked as a prominent lawyer and a politician. For nearly two centuries before that, the family had lived in Sremski Karlovci as respectable land owners, wine-growers and merchants who actively participated in local community's affairs. It is believed that the Avakumović family is probably related to the nobility of St. Andrews (Hungary).

After completing his primary and secondary education in Zemun, followed by a brief study of arts in Rome, he enrolled at the Technische Hochschule in Berlin-Charlotenburg, to study mechanical engineering

(aeronautics in particular), in 1929. In 1931, however, while climbing the mount Triglav, he sustained an injury in a fall which resulted in amputation of his right leg. Following advice by J. Karamata he, in 1932, enrolled at the Faculty of Philosophy of Belgrade University to study mathematics. He was rather an unorthodox student who ignored classes and showed little concern about exams. Nevertheless, in his third year a first paper he wrote appeared in the *Comptes rendues. Acad. Sci. Paris,* introducing the notion of regularly bounded functions which are in contemporary use. He graduated in 1938, having in the meantime published ten papers of which one contained the basic idea for his future doctoral thesis (he obtained his Ph. D. in 1939). He was in fact a self-taught person – apart from Karamata's advices and encouragement – who made his rare mathematical talent evident.

His academic career began before World War II at the Faculty of Technical Sciences of Belgrade University. It gradually developed and in 1951 he was appointed to the post of an associate professor. In 1944 he married Andjelija Tokin and they had three children: Katarina (1945) and twins Marija and Grigorije (1946). During the war the country was devastated, the population suffered all kinds of shortages and the situation was generally aggravated by the *revolutionary changes* which also affected the University. Political pressure was exerted and some students and professors were persecuted as well. Yet, scientific activities of V. G. Avakumović were remarkable. He published papers and presented results of his research at seminars of the newly founded Institute of Mathematics of the Serbian Academy of Sciences and Arts. He was also helping several young mathematicians in their scientific endeavours. Two of them wrote their doctoral. He was mentor to eight so-called *sons of science* altogether.

Three of these later became members of three different Academies of Sciences and Arts in the former Yugoslavia, while other fives became distinguished professors at various German and the U. S. universities. On the other hand, a non-conformist, he readily and courageously spoke his (usually critical) mind. He was labeled an *ideological enemy* by the communist regime and as such was not *politically suitable* for a full professorship at Belgrade University so he moved to a college in Novi Sad. At about the same time he accepted the position of a visiting professor at the University of Sarajevo where he was to reorganize and develop the Mathematics Department. However, the results he achieved in connection with spectral theory of Laplace operators (1952) soon received international recognition (and were even discussed at the H. Weyl's and C. L. Siegel's seminar at Princeton). As the result of this, he was offered the

position of a visiting professor by several European universities; at Gottingen in the autumn of 1958 and during 1959-60. There he decided, although very reluctantly, to leave his country despite being elected a corresponding member of the Serbian Academy of Sciences and Arts in 1958. His first appointment was at the University in Giessen and then at Aachen where he was, at the same time, the Head of the Institute of Applied Mathematics of the Kernforschungsanlage in Jullich. In 1966 he became a full professor at Philipps University in Marburg a. d. Lahn. He retired there in 1976.

His results on Tauberian theorems in the complex domain, on asymptotics of solutions of differential equations and in particular on spectral theory of elliptic operators are reproduced in several well known monographs. Thanks to outstanding achievements of Jovan Karamata, Vojislav G. Avakumović and Miodrag Tomić the famous Belgrade school of classical analysis, founded by Mihajlo Petrović, reached its zenith.

V. G. Avakumović, a man of impressive personality, was utterly devoted to his scientific work. Possessing remarkable and enduring power of concentration he was able to work at a pace beyond any order or apparent sense. Of very broad culture, he was also interested in art and literature. At an early age he wrote poems some of which have been reprinted and included in several modern anthologies. He was a bold alpinist and also a bantamweight boxing champion at the University in Berlin. In his old age, juvenile fascinations returned and he painted numerous aquarelles.

V .G. Avakumović died on August 19, 1990 in Marburg. Honouring his will, his ashes were placed to rest at the Carat Cemetery in Sremski Karlovci, the city of his ancestors.

Author: *Marić, Vojislav*

Jovan BELIĆ
(1909–1997)

Jovan E. Belić was born in Valjevo, on November 23, 1909, the son of Emil, a captain, and Natalija née Stanojević. He finished the first three grades of elementary school in France (Lakanal Lyceum, as a refugee during World War I) and the fourth grade in Novi Sad, in 1919. He attended the first two grades of secondary high school in Novi Sad, and the other two at the Third Belgrade Grammar School for Boys where he passed his final exam in 1928. The same year he enrolled at the Faculty of Agriculture and Forestry, Department of Agriculture, Belgrade University from which he graduated in 1932.

In 1934, upon finishing his military service (1932–33), he was appointed assistant for the subject of livestock production at the Faculty.

On June 10, 1937 he obtained his Ph.D. from the same university, defending the dissertation entitled *Šumadinka, its origin and properties.* He passed his assistant proficiency exam in 1937. He spent his three-month summer vacation in 1936 specializing sheep production and learning about wool under Prof. A. Golf at the Zootechnical Institute, Leipzig University. As a visiting assistant, he specialized in zootechnique under Prof. J. Schmidt at the Zootechnical Institute, Berlin University, from April 1937 to September 1938. His scientific activity became apparent upon his return to Belgrade, which was a famous scientific and educational center at the time.

He was appointed assistant professor in 1940, associate professor in 1947 and full professor in 1954. He taught the subject of special stockbreeding (zootechnique) from the very beginning of his teaching career until his retirement. Between 1940 and 1975 he lectured all generations of future engineers of agronomy at the Faculty of Agriculture in Zemun.

He was the first professor who taught the subject of zootechnique at the Faculty of Agriculture in Novi Sad, from its establishment in 1959. He was also the first university lecturer who taught the new subject – *the basics of stockbreeding in hilly-mountainous regions* – at the Faculty of Forestry in Belgrade, Department of Erosion and Meliorization, until the subject was cancelled in 1967.

Under Prof. Belić's the guidance and supervision, a number of M. A. thesis and 16 doctorate dissertations were written. He wrote textbooks *Special Zootechnique, Manual* and *Album of Livestock Breeds* for students of agriculture and veterinary studies.

In the course of his successful teaching career, he passed all educational ranks and occupied all professional posts at the Faculty. In 1944 he accepted the position of a director at the Institute of Stockbreeding He was the Head of the Stockbreeding Department throughout his active years (except for years 1957-1959). During the academic years of 1950-51 and 1951-52 he was the Vice-dean of the Faculty whereas during 1957-58 he was the Dean.

He was appointed Editor-in-Chief of the *Annals of the Faculty of Agriculture* from its establishment to 1954, and was its Editorial Board member. He was also a member of the Editorial Board of the *Archives of Agricultural Science,* from 1951-1967, an honorary member of the Editorial Board of *Zeitschrift fur Tierziiclitiiug und Ziichtungsbiologie* from 1955 until the end of his life. He was also an editorial staff member of the *Encyclopedia of Agriculture of Yugoslavia* (in charge of editing the field of special stockbreeding) and a fellow-assistant for zootechnique, from 1965 to 1972.

He worked for many zootechnical institutes in Yugoslavia and those abroad (the Institute for Stockbreeding of the National Republic of Serbia in Zemun Polje, the Institute for Stockbreeding of the Autonomous Province of Vojvodina in Novi Sad, the Yugoslav Center for Agriculture and Forestry in Belgrade, the Max-Planck Institute für Tierzcht und Tierernahrung near Hanover, the Bayerische Landesanstalt für Tierzcht near Munich, the Centre National de recherché zootechniques in Jouy-en-Josas, near Paris, and others).

His scientific activities started at the Faculty, in 1934. He had over 120 scientific and expert papers in the field of zootechnique published in many Yugoslav and foreign journals.

The scientific work of Prof. Belić began with the study of Yugoslav (autochthon) breeds that were not sufficiently investigated in terms of their origin and properties such as vitality, resistance, acclimatization and modest nutrition.

The study of imported livestock breeds included investigations of their capability to acclimatize to new conditions and their most important economic properties. The obtained results were to provide reliable information about genetic potentials of imported breed kept under Yugoslav conditions and to establish conditions for using such breeds to improve livestock production.

Prof. Belić's knowledge and scientific methods were applied mostly to improve new Yugoslav breeds of livestock. A long period of study, research and systematic work with his colleagues produced the first Yugoslav early-maturity bread of meat pig which was shown in Subotica, in 1966. Later, the first Yugoslav breed of sheep from the hilly-mountainous region of Serbia was created in Pirot, in 1986 (so called Pirot improved sheep breed). In 1988 the second early-maturity meat pig breed was completed (the so called spotted improved meat breed of pig).

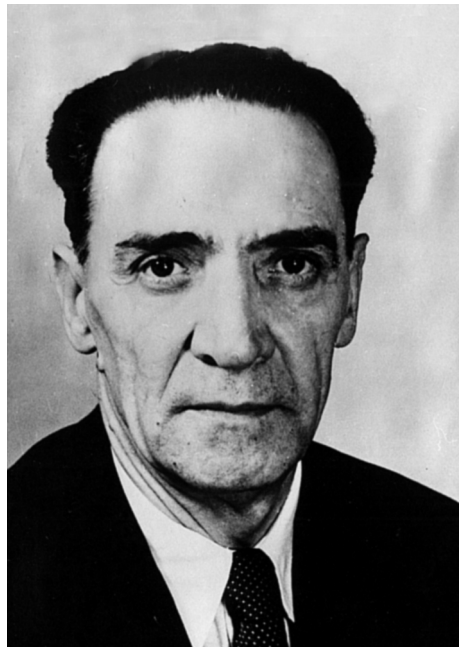
Prof. Belić gave many zootechnique lectures to scientific workers and experts in our country and abroad. He actively took part in many local and international congresses, symposia and meetings, making written and oral presentations.

He was the organizer of the 10th Congress of the European Zootechnique Federation, held in Belgrade in 1959; the 2nd Assembly of the European Federation of Pig Breeders, held in Belgrade in 1963 and the 11th Assembly of the same federation, held in Zagreb in 1974.

He also organized the 1st Congress of Agronomists, held in Belgrade in 1957; the 2nd Congress of Agronomists, held in Zagreb in 1961; and the 4th Conference on Pig Breeding, held in Zemun in 1974.

He was elected to the Serbian Academy of Sciences and Arts, first as corresponding member in 1957 and full member in 1965. He was Secretary of the Academy's Natural Sciences and Mathematics Department from 1973 to 1981 and a member of its Presidency, from 1985 until the year he died. He was elected foreign member of the French Agricultural Academy (Academie d'Agriculture de France).

Author: *Gajić, Živorad*



Radivoje BEROVIĆ
(1900–1975)

Radivoj Berović, the first Serbian haematologist and one of the leading experts in the area of haematology, a university professor and an academician, was born to a distinguished Serbian family in Skadar, Albania, in 1900. He finished his elementary education in Ulcinj and began secondary education at the Orthodox Grammar School in Skoplje. His education was interrupted by the outbreak of World War I. With a group of school pupils he accompanied the Serbian Army on its arduous retreat through Albania. He continued his education in France, and when the war was over, he graduated from Grammar School for Boys. He enrolled at Belgrade Medical School, opened immediately after the war,

and graduated with its first generation, in 1926. His teaching career started even while he was a student – after passing second year exams he became an assistant-intern at the First Internal Clinic. In 1929 he was appointed assistant, at the beginning of 1941 assistant professor, in 1948 associate professor, and in 1957 full professor. He accepted the post of the director of the Internal B Clinic, one of the two internal clinics of the Belgrade Medical School, and was the Head of the Internal Medicine Department, from 1956 until his retirement, in 1970. He was Dean of the Medical School from 1953 to 1962. In 1959 he became a corresponding member of the Serbian Academy of Sciences and Arts and its full member in 1965. In 1971 he was granted honorary Ph.D. from Belgrade University. He also served as president and honorary president of the Serbian Medical Society, was one of the founders and the first honorary member of its Haematological Section, and was a member of the Yugoslav Association of Haematologists. He was Editor-in-Chief of reputable medical journal *Acta medica Iugoslavica.*

Over 80 of his papers appeared in local and international medical periodicals, mostly on the subjects of haematology, metabolism and endocrinology. He paid special attention to the study of diabetes and also addressed problems of cardiology, and liver and kidney diseases. Some of his works are of experimental laboratory character. With Stanoje Stefanović he published the monograph *Clinical Haematology,* in 1951 (had three reprints).

Although a pioneer in the area of new internal discipline of haematology, he was the first to use sternal puncture in order to obtain bone marrow specimen for microscopic examination. Berović was one of the last renowned experts on internal medicine but that did not stop him promote and encourage specialists at his clinic to work jointly in certain sub-disciplines (haematology, pulmology, cardiology, nephrology, endocrinology, and gastroenterology) – all in connection with clinical and epidemiological aspects of problems.

His seriousness, unyielding character and persistence earned him sincere respect and a very good reputation among students and colleagues. His lectures served as excellent examples to his younger colleagues. His criteria for passing exams were high, strict and unwavering.

Authors: *Ruvidić, Rajko; Pavlović-Kentera, Vera*

Anton Dimitrije BILIMOVIČ (1879–1970)

Anton Bilimovič was born on July 20, 1879 in Zhitomir, Ukraine. He finished elementary school in Vladimir-on-Klyazmi. In 1896 he completed his army cadet training in Kiev. He passed exams in Latin and Greek at the Nikolayevsky Engineering School in Petrograd, and then transferred to the Faculty of Physics and Mathematics at Kiev University, where he graduated in 1903 with highest marks.

He defended his M. A. thesis entitled *Equations of Motion for Conservative Systems and Its Application* at Kiev University in 1903.

From 1905 to 1907 he did specialist work in Paris and Gottingen.

Anton Bilimovič defended his doctoral dissertation entitled *Contact Motion of Rigid Body, First Part: Motion with One Degree of Freedom* in Odessa, in 1907.

He worked as an assistant at the Mechanics Department of Kiev University between November 1903 and January 1920 when he left Russia. In 1907 he became associate professor at Kiev University, and in 1915 full professor for the subject of mechanics at Novorossiysk University in Odessa. He served as Rector of the same university for two terms.

Anton Bilimovič worked in Serbia from April 20, 1920 to February 15, 1955 when he retired. On April 20, 1920 he was elected professor under contract at the Faculty of Philosophy, Belgrade University. On February 18, 1925 he was elected a corresponding member of the Serbian Academy of Sciences. On November 3, 1926 Prof. Bilimovič was elected full professor of the Faculty of Philosophy, Belgrade University, for the subjects of rational mechanics and applied mathematics. On February 17, 1936 he was elected full member of the Serbian Academy of Sciences, where he worked as Secretary at the Natural Sciences and Mathematics Department from 1939 to 1940. Besides teaching rational mathematics, he also taught higher mathematics to students of the Faculty of Natural Sciences and Mathematics in Belgrade. Anton Bilimovič retired on February 15, 1955.

Prof. Bilimovič died on September 17, 1970 at the age of 91.

Scientific opus of Prof. Bilimovič, created over the fifty years which he spent at Belgrade University, is enormous and of crucial importance for domestic and world scientific circles. He works appeared in many renowned journals all over the world and in bulletins of various academies of sciences and arts, including *the Belgrade University Journal* which he established, doing his best to bring it to prominence. Prof. Bilimovič published 138 scientific papers, 22 essays, 35 books and textbooks, many of which had a few reprints, 9 texts for popular use, 15 reviews and 15 reports.

In his research he did not address merely the problems of one narrow scientific field. In his papers Anton Bilimovič analyzed problems pertaining to theory of curves and surface, rational mechanics, celestial mechanics and geophysics, non analytical functions and vector calculus. In the field of rational mechanics he was particularly occupied by phenomenological principles, motion of the rigid body around fixed point, dynamics of elastic bodies and equations of motion.

The works of Anton Bilimovič were quoted by world scientists and they served as inspiration to Serbian scientists in their future studies. His

contributions to the science of Serbia and the world were enormous. His influence on the development of the subject of mechanics at Belgrade University was even greater. The positive stimulus spread all over Serbia's newly established universities and also had a permanent effect on young generations being educated at mechanics and mathematics departments between 1920 and 1950. Even nowadays, at the beginning of the 21 century, his influence on the scientific thought of mechanists in Serbia is still felt.

In 1955 academician Bilimovič was awarded *the Medal of Labour of the First Class* for his contribution to the education of Serbia's young generations – many of his students later became successful university professors.

Anton Bilimovič was a co-founder of the Technical Sciences Department of the Serbian Academy of Sciences and Arts. He was also the founder of the Yugoslav Mechanics Society.

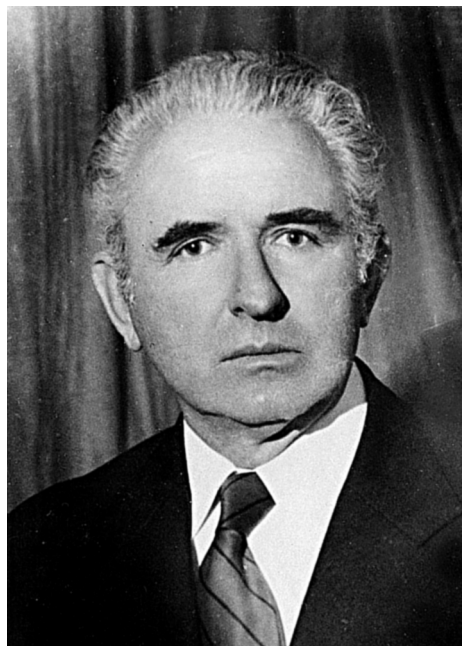
Prof. Bilimovič deserves recognition for disseminating ideas of the Russian school of mechanics in Serbia. He was a co-founder of the Belgrade school of mechanics. Among his first students, writing their doctoral thesis at Belgrade University, were Vječeslav Žardecki, Demčenko, Konstantin Voronjec and Tatomir Andjelić. Many of his students' works, published in Serbian, Yugoslavian and well-known world journals, considerably contributed to the solution of fundamental problems of contemporary analytical mechanics.

In 1926 Prof. Bilimovič initiated the foundation of the Belgrade Univeristy Club of Mathematicians and became its director. In 1932 he also started the journal *Publications de l'Institut mathematique de l'Academie Serbe des Sciences*.

Thanks to the efforts of Prof. Bilimovič, the Institute of Mathematics of the Serbian Academy of Sciences and Arts was founded in 1946. His endeavors also resulted in the publication of the first post-war journal *Publications de l'lnstitute mathematique de l'Academie Serbe des Sciences*, in 1949.

Together with the like-minded individuals, such as Milutin Milanković, Jakov Hlitčijev, Konstantin Voronjec and Tatomir Andjelić, he initiated a mechanics study-group. Following a suggestion of Prof. Hlitčijev, a similar group was organized at the Faculty of Natural Sciences and Mathematics of Belgrade University, in 1952. The group's first professors were the above mentioned founders while Prof. Bilimovič was its first President, until he retired.

Author: *Djukić, Djordje*



Slavko J. BOROJEVIĆ (1919–1999)

Slavko Borojević was born on the 21st of November 1919 in the village of Knezovljani, Kostajnica, the Kingdom of Serbs, Croats and Slovenians and died on September 19, 1999 in Novi Sad. Slavko Borojević attended elementary school in Petrinja and senior high school in Sisak. He enrolled at the Faculty of Agriculture and Forestry, Zagreb University, discontinued the studies to join the National Liberation Army from 1941 to 1945, and graduated from the Faculty in 1947. In June 1948 he was appointed assistant at the Department of Genetics of the same Faculty, where he received Ph. D. title, in 1953, defending the thesis entitled *Heterosis in Rye Crosses between Domestic Populations and Varieties*. He became assistant professor in 1956. In 1957, he transferred to the Faculty

of Agriculture in Novi Sad where he was appointed associate professor of genetics. In 1962, he became full professor. He did additional training in wheat genetics and breeding at the Department of Genetics, in Cold Spring Harbor and at the Department of Agronomy and Genetics, University of Minnesota and St. Paul, USA (1951), the Institute of Plant Breeding in Bologna and the Institute of Genetics in Rome, Italy (1961). He also made study visits from 1951 to 1988 to many countries all over the world.

Prof. Slavko Borojević was an outstanding teacher who taught different courses. Besides genetics, he delivered lectures about plant breeding to graduate students, and lectures about cytogenetics, quantitative genetics, methodology of research work and theory of plant breeding to postgraduate students. He also taught at other faculties in Yugoslavia. In 1979 he was a guest lecturer at the University of California, Davis, USA. He examined a large number of B. Sc. theses, 38 M. Sc. theses and 45 Ph. D. theses, the last six being written by foreign students. As a teacher, he conveyed his enormous scientific experience to his students with great enthusiasm, skillfully and responsibly. In that way he ensured a lasting future for his ideas and knowledge. He knew how to provoke interest and eagerness in students, and instill in them the love for agronomy, a humanistic science the task of which is to provide food for the welfare of the mankind.

Academician Borojević made significant contributions at the national and international level in several fields of research work, namely: genetic study of quantitative traits, theory of plant breeding, development of models of high–yielding wheat cultivars (to be used subsequently for other crops), development of new wheat cultivars adapted to the local agroecological conditions and utilization of their genetic yield potentials, establishment of a bank of plant genes and improvement of wheat production. Borojević's investigations resulted in 140 scientific papers being published, 30 of these abroad, and 30 papers being presented at scientific and professional meetings in the country and abroad (the author attended many of these as a guest speaker). He compiled his lecture notes in several handbooks, wrote seven books of which three had the second edition, and co–authored several monographs. His most important books are: *Genetics* (written jointly with his wife, Prof. Katarina Borojević), published in 1971 and re-printed in 1976; *Methodology of Experimental Research Work,* published in 1974 and again in 1978, *Principles and Methods of Plant Breeding*, published in 1981 and 1992, *Genetic and Technological Changes that Transformed Plant Breeding*, published in 1983. The book *Principles and Methods of Plant Breeding* was translated in Russian (Kolos, Moscow, 1984) and English (Elsevier, Amsterdam, 1990).

Academician Borojević is the principal creator and a co–creator of many cultivars: 92 high yielding winter wheat, 19 spring wheat cultivars

and one winter triticale cultivar. These cultivars had a considerable impact on the wheat production in Yugoslavia and some of them were registered and grown in several European countries. The genetic yield potentials of these cultivars were over 10 t/ha and they significantly increased the national average yields and the total volume of wheat production. The results achieved in wheat breeding make Prof. Borojević one of the most successful wheat breeders in Yugoslavia. His personal authority as regards the method applied in plant breeding in Yugoslavia, and especially in the Vojvodina Province and Novi Sad, makes him the founder of the *Yugoslav school of plant breeding*.

Prof. Borojević was not only a successful teacher and prolific researcher. He actively worked on popularizing agricultural sciences (especially genetics and plant breeding), by writing articles in journals and newspapers, giving lectures or appearing in radio and television programmes. He also worked enthusiastically on wheat production improvement at numerous agricultural estates and with technical services from all parts of the country, making his extensive knowledge and experience available to agronomists, and teaching them how to achieve high and economic yields of wheat.

Academician Borojević always paid a lot of attention to teamwork with foreign scientific institutions and fellow-scientists. He realized this through bilateral research projects (two with the USDA), education and specialization of foreign candidates in Yugoslavia (8 of them from different countries), visits of highly reputable foreign experts in Yugoslavia (more then 30 of them), participation in study trips and scientific meetings, publishing joint scientific papers etc.

Scientific achievements of Prof. Borojević have been recognized in the country and abroad. In 1970, he was appointed a foreign member of the All–Union Academy of Agricultural Sciences in Moscow, the former USSR. In 1999 he became a member of the Academy of Agricultural Sciences of Slovakia. In 1977 he received honorary doctorate from the University of Agricultural Sciences in Godolo, Hungary. In 1979 he became a full member of the Vojvodina Academy of Sciences and Arts and in 1991 a full member of the Serbian Academy of Sciences and Arts. In 1986, he was appointed honorary member of the American Society of Agronomists. In 1969/1970 he spent a year in Egypt, as a UN expert for plant breeding.

During his successful professional career, Prof. Borojević was an active member and executive of many national and international professional organizations. He was the Head of the Wheat Department of the Institute of Field and Vegetable Crops in Novi Sad (1957–1975), Editor–in–Chief of the Novi Sad periodical *Contemporary Agriculture*

(1958–1976), Dean of the Novi Sad Faculty of Agriculture (1960–1962), President of the Yugoslav Society of Genetics (1973–1978), Rector of Novi Sad University (1974–1976), President of the Yugoslav Association of Universities (1974–1976), Board member of the European Association of Plant Breeders (1971–1974), Council member of the International Congress of Genetics (1973–1978), Executive Board member of the International Wheat Genetics Symposium (1973–1978) and the International Conference on Winter Wheat Production (1973–1975), Secretary of the Natural Sciences Department of the Vojvodina Academy of Sciences and Arts (1980–1984), President of the Vojvodina Academy of Sciences and Arts (1984–1988), Editorial Board member of the Berlin scientific periodical *Plant Breeding* (1980–1994).

Prof. Borojević was the recipient of high military decorations and peacetime awards: *the 1941–1945 Service Medal, the Medal of the Partisan Star of the 3rd Order* (1945), *the Medal of Valour* (1945), *the Medal of Brotherhood and Unity of the 1st Order (*1946), *the Medal for Merit to the People of the 2nd Order* (1948), *the Order of Labour of the 1st Class* (1961), *the City of Novi Sad October Award* (1961 and 1971), *the 7th July Award* (1967), *the Liberation of Vojvodina Award* (1974), *the Mihajlo Pupin Gold Medal* (1974), *the Antifascist Council of the National Liberation of Yugoslavia Award* (1975), the *Republic Medal with the Golden Wreath* (1982). He was also awarded the first *Nazareno Strampelli Prize* for his scientific and historical research of agriculture, on the occasion of the Nazareno Strampelli Green Revolution Centenary, Rieti, Italy, 2000.

Prof. Borojević occupied an important and unique place in his area of work. His name is a symbol of new principles applied in the teaching and practice of agriculture, those that stood the test of time and proved their value. He developed and initiated a novel organization of research work in wheat genetics and breeding, and insisted on permanent innovation and regular updates of teaching plans and study programmes. He established and managed post–graduate studies and advanced training programmes at the Novi Sad Faculty of Agriculture, was a co-founder of the Yugoslav Society of Geneticists and activist campaigning the launching of multidisciplinary research projects at the Vojvodina Academy of Sciences and Arts. A skilful leader, he commanded undisputed authority, teaching skill and influence on people around him. Only a leader of such charisma could transform his enormous scientific and teaching energy into a life–long project, and this is why the results he achieved are so extraordinary and enduring.

Authors: *Mihaljev, Ivan; Petrović, Stevan*

Stevan P. BOŠKOVIĆ (1868–1957)

Stevan Bošković organized first modern geodetic works in Serbia and Yugoslavia. He designed and established first trigonometrical control and leveling network in Serbia which he used while conducting precise topographical survey of the terrain. He incorporated state-of-the-art scientific and professional achievements in his projects, improving them with some of his own solutions, modifying measurement methods, surveying instruments and equipment. He also carried out the first astronomical measuring with the objective of ascertaining the shape of geoides throughout the territory of Serbia. He established links between his geodetic works in Serbia with similar undertakings in neighbouring countries

establishing geodetic continuity among the Balkan countries and linking them with Europe in the process.

For four decades he was in charge of all the projects of the Military Geographical Institute. He was the first geodesist-general in the history of the Serbian and Yugoslav armies. As an active member of the International Union of Geodesy and Geophysics, the International Geographical Union and other international associations, he gave a significant contribution to international geodetic and geographical projects and influenced the national efforts of numerous countries. He also was the only geodesist who, in recognition for his work contributions, was accepted into the Serbian Academy of Sciences.

He was born in Zaječar, on May 10, 1868. After high school, he entered the Military Academy, which he completed in 1889. Having worked for three years in Niš, he spent seven years in Russia, (1892-1899), pursuing geodesy studies. In St. Petersburg he graduated from the Military -Topographic School and the Geodesy Department of the St. Nicholas' General Staff Academy, followed by a supplementary course in astronomy and geodesy at the Observatory in Pulkov.

In 1899 he returned to Belgrade and was appointed professor of geodesy at the Military Academy. He held this post until retirement. From 1899 he was also in charge of running the Military Geodesy Service, first as the Head of the Trigonometry Division of the Geography Department, and then (from 1900) as the Head of the entire department.

By 1905 he developed the first triangulation of the Kingdom of Serbia which he had personally designed, complying with the highest professional and scientific standards of the time. In 1904, he linked this network with the Austro-Hungarian triangulation net, integrating it thus into the European geodesy works. He simultaneously developed precise leveling of the Kingdom of Serbia which, in 1904, he also linked with the Austro-Hungarian leveling network, making elevation in relation to the mean level of the Adriatic Sea possible for the first time in Serbia. These geodesic works are the cornerstone of the basic geodesy nets which are still being used today in Serbia and Yugoslavia. In addition to his geodesic projects, he personally carried out astronomic measuring at 30 different points throughout Serbia, with the aim of establishing the form of geoides throughout the territory of the state.

Proceeding from this mathematical foundation, in 1906 Bošković undertook a precise topographic survey on a scale of 1:25,000. With the outbreak of the Balkan Wars first, and then World War I, the works on the net and the systematic survey had to be discontinued between 1912 and 1920. During that period, Bošković's Department worked tirelessly to sat-

isfy the war needs. They helped the retreating Serbian Army during its ordeal and also after its relocation to Corfu and the vicinity of Thessaloniki later on, where the Department also catered for the needs of the Allies.

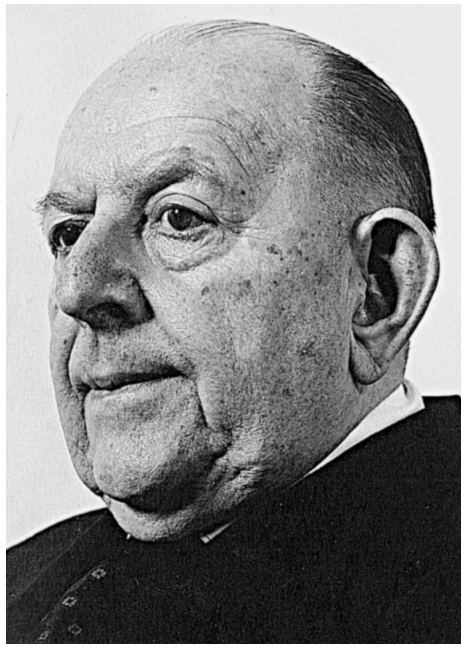
Upon the liberation of Serbia and the creation of Yugoslavia, General Bošković resumed his pre-war geodesy projects extending then to the territories of the Novi Pazar Sandžak, Kosovo, Metohija, Montenegro and Macedonia, according to the same principles and with the same accuracy of the measured angles, lengths and altitude differences. He connected his triangulation and levelling networks with all our neighbours, thereby creating an integrated geodesic system among the Balkan countries and linking them to European geodesy works. Proceeding from this mathematical foundation, he organized a topographic survey on a scale of 1: 50,000 and the making of a map on a scale 1: 100,000. Revising the 1: 25,000 Austro-Hungarian maps he made a 1:100,000 map for the other Yugoslav provinces as well, so that by 1933 the entire territory of Yugoslavia had been depicted on the leaves of this map. The map was in use for several decades after that, and also served as the basis for drawing smaller scale maps.

Stevan P. Bošković was an active member of a number of international associations; he was a delegate of the Serbian Academy and of the Ministry of the Army and Navy at six congresses of the International Union of Geodesy and Geophysics, four congresses of the International Geographical Union, and congresses of the Slav geographers and ethnographers. At these congresses he presented papers describing the projects of the Military Geographical Institute, sat on many commissions, (some of which were of standing nature), delivered lectures and gave suggestions for the improvement of national works and the future activities of these associations.

Based on his ideas and recommendations various instruments and equipment for geodesic and astronomical works were improved. He modified the method of measurement of lengths and increased the precision of pointing in the measurement of horizontal angles. He designed a lightweight and stable plane table, and it was based on his idea that the theodolite – alidade for detailed measurements by the numeric and the graphic methods was developed.

Stevan P. Bošković published numerous works in the fields of geodesy, astronomy, geophysics and geography. He is the author of a number of geographical maps. He was a full-member of many foreign and Yugoslav learned societies. He died in Belgrade, on May 9, 1957.

Author: *Radojčić, Stevan*



Branko BOŽIĆ
(1907–1991)

Branko Božić was born in Osijek, on March 9, 1907. He finished secondary education in 1925. He later studied at the Faculty of Technology, the Chemistry Department, in Zagreb which he graduated from in 1929. He commenced working on his doctoral thesis in 1929, and two years later he obtained his Ph. D. degree in Aachen.

After finishing schools, he held several different job positions. Until 1941 he worked as an operation assistant and was the Head of the Department for Technical Control at the Iron Works AD in Zenica. Between 1941 and 1944, he worked for the Ministry of Civil Engineering and the Institute for Materials Research. He was also director of the

Cement Works in Ralja and an associate of the Mannesmann Pipes Plc. Company.

Continuing his professional career he became the head engineer in the Ministry of Iron and Steel Industry in 1964. Two years later he accepted the post of a manager of the Materials Research Laboratory at the Vinča Institute.

In 1950 he became assistant professor, and in 1951 full professor at the Faculty of Technology in Belgrade. He was also the Head of the Iron and Steel Metallurgy Department, the Head of the Physical Metallurgy Department, the Head of the Metallurgy Department and a Dean. He retired in 1976.

At the faculty, he laid down the foundations of research work in the field of physical metallurgy with the basic aim being the study of micro structure changes in metals and alloys determined by kinetics and mechanisms of phase transformations. Attention was also paid to studying inter-relationship between material properties and the way certain structures behaved within heterogeneous metal systems under different physical conditions.

Strengthening of alloys by combined reactions in solid state and mechanical deformities were also the subject of his research studies as were the effects which conditions of crystallization have on alloy structure, the role of grain boundary in polycrystalline material reactions, transformational reactions within different metal systems, as well as flexing of material particularly of stainless chromium and high alloy steel.

Extensive research was also done into the process of thermal precipitation in copper-chromium alloys. The deciding role of vacancy in the precipitation process was also confirmed as was the interaction between vacancy and atoms of chromium in the process of interrupted tempering and the process of direct precipitation.

Scientific and research activities are said to have been pointing out in two different directions. One of them included the study of chemical and physical properties of aluminum, copper, steel, zinc and other type of alloys, as well as the interdependence of different mechanisms for strengthening of metals and their structure, namely alloys and their mechanical properties. The other study areas included research into the size and shape of sedimentary particles, space between isolated particles and metals as well as factors that have effect on the movement within the atomic structure of metals.

Along with the basic research, studies also included the development of new alloys and their improvement by the existing alloyage, thermic, thermodynamic and other processes.

Božić was also the author of numerous expertise papers and surveys on the subject of certain types of metals and their classification within steel metallurgy and non-ferrous metallurgy.

He forged close links with industry, where he studied aluminium and manganese alloys, economical and slightly alloyed chromium magnesite steel, aluminium-zinc-magnesium alloy, copper and chromium alloy.

His publishing activities were impressive. Alone, or assisted, he produced a great number of textbooks for students as well as other books. He also had numerous articles published in the leading domestic and foreign periodicals.

Academician Branko Božić died on March 29, 1991.

Author: *Mišković, Borivoje*

Branislav BUKUROV (1909–1986)

Branislav Bukurov was born on May 13, 1909 in the village of Ostojićevo, Northern Banat, to a family of teachers. He died on April 20, 1968 in Novi Sad. After cremation, his ashes were scattered over the Remembrance Garden of the New Cemetery in Belgrade.

He completed elementary school in Ostojićevo, started Grammar School in Kikinda and finished it in Senta, in 1927. He studied at Belgrade University, from which he graduated in 1931. His first scientific work *Ada* was published the same year. From that time on, during his entire career spanning fifty five years, his outstanding creative activities were not interrupted even after he retired on October 1, 1977.

Upon graduation, Bukurov worked for a while as a volunteer of the anthropogeographical group at the Faculty of Philosophy in Belgrade. From 1933 to 1941, he worked first as a substitute and then as a grammar school teacher, in Senta. He did not work, of his own accord, during World War II and the period of occupation of Yugoslavia. In the years before Hitler's Germany attacked Yugoslavia, he did research work about the Tisa valley. His doctoral dissertation entitled *The Tisa Valley in Yugoslavia* was written and submitted just before the War broke out. The forthcoming events postponed the defense of his dissertation until 1946. In December 1946, having obtained a Ph. D. in geography, he was elected professor at the newly established Teacher-Training College in Novi Sad. During 1957 and 1958, he worked as a lecturer at the Geographical Department. He returned to Novi Sad and, at the Teacher-Training College, thought a two-year course in geography and history. In 1961 this course was transferred to the Faculty of Philosophy in Novi Sad, as part of the history syllabus. Bukurov was appointed full professor at that Faculty in 1960. In 1962 Prof. Bukurov established an independent department of geography for a four-year period. In 1969 that department was linked to the newly established Faculty of Natural Sciences and Mathematics. In 1976 the department became the Institute of Geography and was headed by Bukurov until his retirement in 1977. Thanks to his mastery of the Hungarian and German languages, he was fully acquainted with works written in those languages about Vojvodina and the Pannonian plane. The materials were scarce and he was aware that geographical investigation of Vojvodina is yet to be done. He dedicated his whole life to that task. As researcher and educator, equally brilliant at all geographical disciplines, he left indelible mark on Serbia.

Bukurov's scientific contribution to physical geography is seen in many important studies where original conceptions on the genesis of micro and macro relief of Vojvodina are presented: *Geomorphological characteristics of South Bačka, 1953; Geomorphological Survey of Vojvodina, 1953; Geomorphological Conditions of Banat Sub-Danubian, 1954; Geomorphological Conditions of North Banat, 1961; The Problems of Genesis of Relief of Vojvodina, 1966; Physical and Geographical Problems of Bačka, 1976; Synthetic Considerations of Geomorphological Problems on the Territory of Vojvodina, 1982,* etc.

His research into social geography followed two directions: 1. scientific basis of economic and traffic geography and 2. important studies on population of Vojvodina and rural and urban settlements of the Province (*Geographical Basis of Economy of Bačka, 1956; The Role and Place of Vojvodina in Crop Production of Yugoslavia, 1956; Alluvial*

Planes as Environment in Vojvodina, 1975; Origins of the Population of Vojvodina, 1957; Influence of Geographical Conditions on New Settlers in Vojvodina, Colonization of Bačka During World War II, 1967; Geographical Position of Settlements in Bačka, 1952; Geographical Position and Territorial Development of Towns in Banat, 1954; The Sphere of Gravitation Vojvodina Towns, 1970; Classification of Towns in Vojvodina, 1973.)

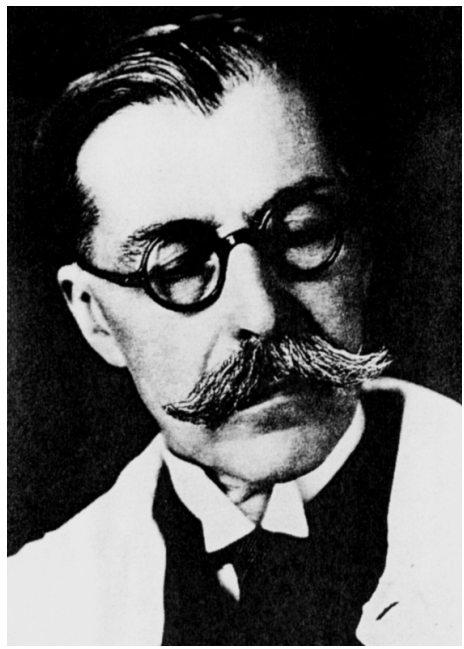
Bukurov's enormous scientific contribution to regional geography has been preserved in his principal works among which are comprehensive geographical surveys of Vojvodina (in his book *Vojvodina – Beauties and Historical Sights 1968*), Bačka, Banat, Srem, 1978, and seven monographs on Vojvodina municipalities (*Bački Petrovac* 1976; *Ada,* 1979; *Beočin,* 1981; *Žabalj,* 1983; *Subotica and its Surroundings,* 1983; *Titel*, 1986; *Ruma,* 1990;), published posthumously.

The mentioned, and other, works represent a scientific base for regional planning and future economic and other kinds of development. During his twenty-year-long service as the Secretary of the Natural Sciences Department at Matica Srpska, he organized scientific works through various long-term projects (colonization of Vojvodina after World War II, Study of Urban and Rural Settlements of the Province, Interdisciplinary Study of the Fruška Gora Mt. and others). Thus he directly facilitated the establishment of the University of Novi Sad.

In the area of pedagogy, he produced three manuals for investigation and 14 textbooks (2.764 pages). He was a member of the Serbian Geographical Society and president of its managing board.

In recognition for his scientific, pedagogical and organizational achievements, he was awarded a number of high scientific and public honours. Only some will be mentioned: he was elected corresponding member of the Serbian Academy of Sciences and Arts in 1968 and full member in 1978, and full member of the Vojvodina Academy of Sciences and Arts in 1979. He was a recipient of the *Jovan Cvijić Medal*, the highest recognition by the Serbian Geographical Society, and the only Yugoslav geographer who received the highest state honor at the time - *the AVNOJ Award*.

Authors: *Carić, Nebojša; Bugarski, Dragoljub*



Rihard BURIJAN (1871–1954)

Development of physiology in Serbia began in 1910, with the founding of the first Department of Physiology at the Faculty of Philosophy in Belgrade and the arrival from France of the first educated philosopher, Ivan Djaja (1884–1957), also a follower of the school of physiology of Claude Bernard. An important point in the development of the discipline was the coming of the renowned German physiologist and scientist Rihard Burijan (1871–1954) who founded the first Institute of Physiology at Belgrade's newly founded Medical School in 1921. Prior to his arrival to Belgrade University, Dr Rihard Burijan worked as a professor of physiology at the Universities of Naples and Leipzig.

Once in Belgrade he presented the spirit of German physiological school with its analytical line of thinking, the founder of which was the German Carl Ludwig. In 1869, Carl Ludwig, (1816–1875) founded the world's first Institute of Physiology at Leipzig where Richard Burijan began his career as a teacher and a scientist, and also conducted research work that earned him international acclaim.

Prof. Rihard Burijan was the founder of medical physiology and medical biochemistry in Serbia. For two decades he lectured physiology at the Medical School in Belgrade and wrote first textbooks on the subject. He was born on January 1, 1871 in Vienna. He graduated from grammar school and studied medicine there. He became a doctor of medicine in 1984. After completing the studies, he spent two years working as an assistant to the renowned Prof. of internal medicine Edmund Neusser (1852–1912). He also worked in university chemical laboratories with the famous chemists Adolph Lieben and Julius Mautner. Later on he went to Leipzig and the Institute of Physiology, and became an assistant to Evald Hering (1834–1918), a direct successor of Carl Ludwig. In 1900 he became a docent at Leipzig University, following the presentation of his paper *Die Dissimilation purine per Säugetiere*, and delivered first lectures on physiology and physiological chemistry. In 1905 he moved to Naples where he became manager at the Institute of Zoological Oceanography, and organized scientific research work there. In 1910, he was appointed professor of physiology at Naples University. The onset of World War I in 1914 interrupted his productive scientific career. He returned to Leipzig and the Institute where he was in charge of teaching the subject of physiology.

In 1920, after having been unfairly dismissed during yet another selection for a professorial position, he left Leipzig and came to Belgrade and the Medical School that had just opened. He founded the first Institute of Physiology in Belgrade and, under very modest circumstances, began lecturing. In 1926 the Medical School acquired a new building, made to his design, which housed the Institute of Physiology and Histology. In the same year he was elected corresponding member of the Serbian Royal Academy. He was Dean of the Medical School during three academic years. In 1936 he was elected Dean of the newly founded Veterinary School and in 1939 the Head of the Pharmaceutical Department of the Medical School. Prof. Burijan retired after the onset of World War II. He stayed in Belgrade during the occupation and went to live in the USA after the war had ended. There he continued receiving the pension money from the Yugoslav government. He died on April 6, 1954.

Burijan became well know for his prolific scientific work at the famed Institute of Physiology at Leipzig where he studied metabolism of

purine and the origin of the *endogenous* and *exogenous uric acid*. Burijan published his research results from the filed of physiology and chemistry (biochemistry) in the world's first specialized bulletin *Zeitschrift für physiologische Chemie.* He also studied the chemistry of *purine* bases and the way they combined within nucleic acids. Using a specific reaction he proved that *purine* bases in nucleic acids were combined via nitrogen in position 7. He also examined *xanthine oxidation* using *xanthene oxidize enzyme* and the kinetics of the reaction. This reaction has recently been thoroughly investigate because the reaction plays a significant role in the formation of free radicals in the isochemistry of the myocardium and the brain.

Burijan's study of the dual origin of uric acid in the man earned him world-wide repute. He established a hypothesis whereby uric acid originates out of the purine base of food (*exogenous*) and from the purine base formed in the organism itself (*endogenous*), in order to test this hypothesis, Burijan developed exact methods of detection of uric acid in food, animal organs, blood and urine. Based on his extensive research work Burijan also concluded that uric acid excreted from the urine of a person who has a regular diet consists of two components: *endogenous* and *exogenous*. The *endogenous* component disappears if the person does not take food which contain purine base. However, the content of *exogenous* uric acid in urine over the 24-hour period differs in various persons, while remaining almost constant in one person regardless of the food being rich in protein or not. If *purine* base is missing from the food, excreted amount of uric acid is constant in every individual. Burijan also proved, in the same way, that *endogenous* uric acid originates not only from nucleic acids of decomposed cells (primarily leucocytes) but also from *purine* base of muscles, which is why its excreted amount temporarily increases after a strenuous muscle work. Burijan's concept of the *endogenous* uric acid was generally accepted in scientific circles and was included in textbooks on physiology and physiological chemistry as part of our knowledge about the metabolism of man. The concept was also quoted and was widely used in the German textbook *Physiology of Man (Lehrbuch der Physiologie des Menschen)* by Leonard Landoise that had 28 re-prints.

At the Physiological Department of the Zoological Oceanographic Institute, Burijan dealt with various issues regarding general and comparative physiology, but primarily the physiology of muscles and nerves. He was first to prove that *amyelin nerve fibres*, unlike the *myelin* ones, demonstrate typical sings of fatigue during their uninterrupted functioning. On the other hand, Burijan carried out several research works regarding the mechanism of kidney functions based on which he concluded that

the functioning of *glomerulus* cannot be reduced to the process of an ordinary filtering only and that it also differs from ultra filtering. During World War I, Burijan developed a procedure for obtaining *glycerol* from sugar (starch) using a lacteous acid bacterium, which he named *Bacillus Krusei.*

After arriving to Belgrade, and its newly founded Medical School, works of Prof. Burijan were connected mostly with issues of general physiology of muscles. Burijan established a hypothesis whereby, provided normal stimulation of skeletal muscles was induced, two processes happened simultaneously. The primary, or the real one, is a process of excitation which is now known to represent bio-physical changes in the cell membrane of skeletal muscle and the second (resultant) one is followed by muscle contractions the essence of which is an interaction of contractile proteins that were discovered many years later. As far back as the 1930s, Burijan thought that the activation of a horizontally striated muscle consisted of two processes that were more explicitly described and verified only some thirty years later after the application of a more complex research methodology. Part of research results, which Burijan conducted with his assistant Dr Ilija Djuričić, was presented at international congresses of physiologists in Stockholm, 1926, and Rome, 1932. Larger part of his research work remained unpublished since the entire documented material was destroyed during the 1941 bombing of Belgrade. The newly erect building of the Institute of Physiology and Histology, which could serve to testify about the extraordinary creative energy of its founders, was almost completely destroyed then. There, however, were a lot of students and followers of Prof. Rihard Burijan who, after World War II was over, founded institutes of physiology in almost all of Yugoslavia's towns. They continued along the path set out by Prof. Burijan, who left a deep mark on the development of physiology and biochemistry in our country.

Author: *Jović, Pavle*

Jovan CVIJIĆ
(1865–1927)

Jovan Cvijić was born in Loznica, on October 12, 1865 and died in Belgrade, on January 16, 1927. He completed his early education in Loznica, Šabac and Belgrade, and graduated from the College of Natural Sciences and Mathematics in Belgrade, in 1888. His postgraduate studies took him to Vienna where his doctoral dissertation entitled *Das Karstphaenomen* won him his Ph.D. In March 1893 he was appointed College professor, and in February 1905, with seven other eminent scientists and educationalists, he received permanent chair at the University. Between 1894 and 1907, he taught all geographical subjects. He was twice elected rector: in the 1907/08 and 1919/20 school years. During his

second mandate, he helped establish five faculties and restore the war-damaged university building. From 1921 to 1927, he was president of the Academy of Sciences. Commissioned by the Serbian government, he performed important political assignments in London in 1906 and in Paris, Rome and Athens in 1915. At the 1919/20 Peace Conference in Versailles, he chaired the historical-ethnographic section of our experts, and made an important contribution to the incorporation of Banat, Bačka, Baranja and Dalmatia into our state. At the invitation from eminent French geographers, he lectured at the Sorbonne on the Balkan peoples and lands during 1917, 1918 and 1919.

Cvijić founded the first geographical institutions and associations on the Balkan Peninsula, the Geographical Institute in 1893, and the Serbian Geographical Society in 1910, as well as the *Journal of the Serbian Geographical Society* in 1910. He also launched a geographical seminar to train his students in field research. Between 1902 and 1927, he published within the Academy of Sciences 24 large volumes entitled *Settlements and Origins of the Populations,* which included 60 monographs by his collaborators. The latter pursued his geographical thought and initiated organized team research in this country.

Between 1888 and 1925, Cvijić conducted systematic exploration of the Balkan and other countries, covering an area of 500,000 square kilometres. A major part of his time was spent in exploring Eastern and Old Serbia, Macedonia, Bulgaria and the karst areas in the Dinaric Alps. For a while, he studied geotectonic and glaciological problems, before dedicating himself to karst research, and in his more mature years his interest centred on anthropogeographical and ethnographic questions.

Jovan Cvijić published 47 works on the relief and the hydrography of karst. His most valuable results were those published in *Das Karstphaenomen, Kraška polja zapadne Bosne i Hercegovine,* and *La geographical des terrains calcaires.* There he explained the origins and development of all karst formations and the extremely complex water circulation in the karst. With these works Cvijić won fame as the founder of the karst science into which he introduced several Serbian words as scientific terms *(uvala, ponor, polje, hum, dolina).* In Rila and many Dinaric mountains he discovered traces of Pleistocene glaciers, repudiating the claims by illustrious foreign glaciologists that there was no glacial age on the Balkan Peninsula. His major glaciological findings were set out in his studies *Glaciations of Rila* and *the Ice Age in the Prokletije Mountains.* Exploring the large mountain systems, basins and tectonically unstable zones, he made an important contribution to tectonic geology, while by studying the old volcanic relief he advanced knowledge in vulcanology.

He was our first naturalist who made a systematic study of our lakes, thereby founding limnology in our science. The results of his field research in geomorphological and geotectonic problems have been laid out in his two-volume study *Geomorphology* on 1094 large format pages.

The relationship between the man and his geographical environment was at the centre of Cvijić's anthropogeographical research. His field research led him to establish principal migrational directions of the Balkan's population and their complex consequences. He was first to carry out a scientific classification of settlements based on their positions, types and prevailing functions. He also studied the changes that occurred in the economies of the Balkan countries during the 19th, and at the turn of the 20th centuries. The methodology of his research was explained in his study *Anthropogeographical Problems of the Balkan Peninsula,* synthesising his findings in the 517-page monograph *Balkan Peninsula and the South Slavonic Lands,* first published in French, in Paris and then in Serbian, in Belgrade.

In the course of his research Cvijić delved into the problems of historiography, economy and sociology. Examining the effects of the surrounding geographical environment and cultural heritage on the man, he developed ethno-psychological research and founded ethno psychology. A synthesis of all his naturalist, anthropogeographical and ethnographic considerations was published in his three-volume monograph *Fundamentals of Geography and Geology of Macedonia and Old Serbia* on 1272 large format pages.

Outlined in the four volumes of his book *Speeches and Writings* are his views on the dynamic social processes in this country, his visions of future relations among the South Slavonic peoples, on the state organisation and our scientific and political resources.

Author: *Vasović, Milorad*

Pavle IVANOVIĆ ČERNJAVSKI (1892–1969)

Pavle Ivanović Černjavski was born in Rostov, on June 20, 1892. After completing his secondary school education, he studied in Harkov. He came to Yugoslavia in 1920 where he lived and worked for 30 years. He was custodian of the Herbarium at the Botanical Garden of Belgrade University and the Museum of Natural Sciences. Subsequently he was elected assistant at the Faculty of Forestry. In 1936 he defended his doctoral dissertation under the mentoring of Prof. Vladimir Laskarev, whereupon he was elected professor at Belgrade University where he taught botany to future agronomists and engineers of forestry.

In 1950, P. I. Černjavski went to Sophia, Bulgaria, where he took the post at the Institute of Forestry. After 10 years in Bulgaria, he went to his fatherland, Russia, to Volgograd. He died in 1969.

Majority of Prof. Černjavski's works, written in German, were published in most renowned journals; e.g. his Ph. D. thesis appeared in *Beichefte zur Botanische Centralblat,* some others in limnology journals. During his stay in Bulgaria and Russia, his works were published in Bulgarian and Russian respectively. He fully addressed certain botanical issues such as floristic as well as those of phytocenelogy and geobotany, phyto-taxonomy and paleobotany (paleopalynology in particular). He published important works in almost all of the mentioned fields. His students, who achieved considerable scientific success, followed Prof. Černjavski's pioneering activity.

Almost one third of the plants collection that is housed at the Museum of Natural Sciences in Belgrade was collected by Prof. P. I. Černjavski. The Herbarium has been arranged and processed according to the international criteria.

Černjavski left to our science works of great importance, especially in the field of history of vegetation. Using pollen analysis he was able to conduct research, such as that of the genus Thymus that existed in Belgrade vicinity, and provide relevant conclusions. Based on the very study of that polymorphous genus, he wanted to express his opinion on the evolution of plants, adaptability of certain varieties and forms, thus showing that critical genera and plant species could be addressed only in the way he did with the genus Thymus.

Prof. P. I. Černjavski was a remarkable man, always willing to help the young scientists, emphasizing the country's need for educated professionals and steering them in the right direction at work. A noble person, he was ready to provide any kind of assistance. His efforts earned him the wide-spread respect among his colleagues.

Černjavski educated and trained an enviable number of students, who, by the rule, had achieved exceptional scientific results in his field. Under his supervision many students defended their doctoral dissertations and became recognized scientists, university professors, academicians and members of distinguished scientific institutions.

Authors: *Janković, Milorad M.; Tatić, Budislav B.*

Dimitrije DANIĆ
(1862–1932)

Dimitrije Danić was born in Belgrade, on January 21, 1862 and died on March 23, 1932. He finished elementary school in Belgrade and secondary school in Zurich. He then completed three semesters at the Berlin Polytechnic and seven semesters at the Natural Science and Mathematics Department of Berlin University, majoring in mathematics.

He defended his doctoral thesis *Conformal Mapping of Elliptic Paraboloid on Plane* at Jena University, in 1885 where he also passed oral part of his dissertation. He applied for the post of a lecturer of lower mathematical analysis at Belgrade College on two occasions; in 1885 and in

1887, but was not accepted as full-time professor. Disappointed, he left Belgrade College and joined the Military Academy where, after only nine months, in December 1888, he was elected full-time professor of mathematics. He taught at the Military Academy until he retired.

At the Military Academy, Dimitrije Danić taught all courses in mathematics, which, according to the school curriculum were of the same quality as courses taught at Belgrade College, and later on, at Belgrade University.

In his dissertation, Dimitrije Danić contemplated conformal mapping of elliptic paraboloid to plane base on Gauss definition, i.e. the mapping of characteristic intersections of elliptic paraboloid for different forms of the function. In his work the author used differential and integral calculus for solving the obtained differential equations. He had to solve complex elliptical integrals. His contributions include also the introduction of elliptical transformations of variables and the use of elliptical functions. He considered their interconnections, and connections with elliptical integrals. Broadly speaking, he used the theory of complex functions of complex variables.

Bearing in mind the era in which this work was presented to the public, and the level of development of mathematical analysis applied at Belgrade College, his dissertation is rightly considered a significant contribution to the development of mathematics here.

He wrote eight textbooks and manuals:

Formulas and Theorems in Trigonometry (1888); *Analytical Geometry on Plane* (1893); *Lectures on Trigonometry with Theory of Logarithm and Complex Numbers* (1889); *Foundations of Infinitesimal Calculus–Differential Calculus* (1920); *Foundations and Theory of Combination and Principles of Probability* (1921); *Foundations of Infinitesimal Calculus and Integral Calculus* (1922); *Analytical Geometry of Plane and Space* (1922); *Formulas and Theorems of Mathematics* (1927).

All those works occupy over 2.000 textbook pages. Some of them, for example *Analytical Geometry of Plane and Analytical Geometry of Space*, or *Foundations of Theory of Combination and Principles of Probability* represent a pioneering endeavor.

At the Military Academy, Prof. Danić was a very strict professor who used high criteria in working with students. Besides pedagogy, he was interested in problems of inner and outer ballistics of various arms

and weapons. He analyzed results of combat marksmanship, fire dispersion and target marking. He applied his knowledge on Jacob Bernoulli's independent experiments.

Danić received a special reward, *the Order of St.Sava of the 4th, 3rd and 2nd Class*, for his outstanding scientific achievements.

Author: *Vučićević, Radič*

Branko DIMITRIJEVIĆ (1891–1959)

Branko Dimitrijević was born in Kruševac, on 4th May 1891, where his father worked as a teacher. He finished his primary education and the first year of high school in Paraćin, and the remaining years of high school in Kruševac where he graduated in 1910. The following year he enrolled at the Faculty of Philosophy, the Mineralogy and Petrography Department. He was wounded on the Thessalloniki front in 1917 and was transferred to France for treatment. He studied geology in Grenoble after which he returned to Belgrade to continue the interrupted studies. In 1921 he graduated from the Faculty of Philosophy and was elected full time assistant. He spent 1926/27 in Paris, at the Sorbonne and the Museum of

Natural Sciences, and studied under professors Alfred Lacroix and J. Orcel where he became acquainted with new methods of research in mineralogy and petrography. The stay was very conducive to his work on the doctoral thesis about the mount Avala and its broader vicinity. In 1930 he defended his thesis entitled *Avala, Petrographic and Mineralogical Study* at the Faculty of Philosophy in Belgrade (the paper was published in 1931 in a separate edition of the Serbian Royal Academy). In 1932 he was elected part-time assistant lecturer while a year later he became a full-time assistant lecturer in the subject of agro-geology at the Faculty of Agriculture and Forestry in Belgrade. He became assistant professor in 1939. During World War II he was imprisoned in Germany but was released and sent back home on account of his poor health. He was elected full professor in 1948. From 1947 he was a part-time science assistant at the Geological Institute of the Serbian Academy of Science and also supervised geological research of crystalline terrains in Serbia. He was the head of the Department of Soil Studies at the Faculty of Agriculture in Belgrade, a part-time professor of agro-geology at the Faculty of Agriculture in Novi Sad (during the 1954/55 school year) and the Faculty of Forestry in Belgrade. He was president of the Serbian Geological Society between 1953 and 1959. He died in Belgrade, on January 13th 1959.

Branko Dimitrijević studied mineralogy, petrography, regional geology, agrogeology and pedology. Among his most prominent works are the ones about petrography (volcanic rocks in particular) and agrogeology. Thanks to him the method of microscopic research of ore minerals started being applied at the Institute of Mineralogy and Petrography in Belgrade, in 1929.

He studied the mineralogy properties of axinite from the mount Rudnik and the sand from Deliblatska peščara (*peščara* is the Serbian equivalent for a sand-desert). Dimitrijević was first to make chemical analyses of vein rocks found in the vicinity of Belgrade (1928). The most important work of Prof. Dimitrijević was his study of Avala which is being quoted even today. His theoretical studies were enriched by laboratory experiments of the samples aided by the most modern methods (in Belgrade and Paris). Dimitrijević made first microscopic examination of various sedimentary rocks from Avala and found chert with foraminifera and radiolarian. In order to explain the origins of the sedimentary rocks, he chemically analysed certain types of limestone. He paid most attention to eruptive rocks from Avala, establishing the range of their distribution and relation towards other formations, and determined their petrographic and chemical composition. He discovered that Cretaceous sediments were

deposited over serpentinite, which means that serpentinite predated the Cretaceous period. He wrote a special chapter about decomposition of serpentinite and its hydrothermal alterations which occurred in the younger Tertiary period. He examined mineralogical and chemical properties of the products resulting from such alterations (magnesite, quartz, dolomite, barite, avalite) as well as the presence of ore in quartz masses of serpentinite (cinnabar, calomel).

Geological and petrographic, as well as mineralogical and mining research of Kosmaj was conducted after the study of Avala had been completed. In Banjica (a Belgrade suburb), during 1932, Dimitrijević studied volcanic rock–phonolite – a unique phenomenon occurring on the Balkan Peninsula. By undergoing microscopic and chemical analyses of phonolite, he established its mineralogical properties and also discussed its petrographic quality in comparison with a similar rock found in Overnie, France, as well as its genetic connection to other eruptive rocks from Avala. Dimitrijević was first to discover (1933) and describe basalt on Rudnik, in 1938. After World War II, he dedicated time to studying crystalline schist (Juhor and Crni Vrh) more than volcanic rocks. During 1938, together with his assistant Oton Stoker, Dimitrijević underwent petrographic, agrogeological and pedological analyses of the region of Ješevac and Crni Vrh in Šumadija. In 1939 they conducted the same kind of research around Belgrade. During 1952 and 1953, he examined the red soil of Cretaceous sand stones in Šumadija.

He also wrote obituaries for several of his deceased professors and colleagues: Sava Urošević, Jovan Žujović, Djordje Zloković, Oton Štoker, Mihailo Kojić, Svetolik Stevanović and Fran Tucan. Branko Dimitrijević was a geologist of a rare kind, also a naturalist who tried his hand at literature. He wrote humorous and satirical stories and causeries that appeared in different papers. His book *Cheats and Other War Humoresques* came out in 1939.

Author: *Jović, Vidojko*

Živojin M. DJORDJEVIĆ (1872–1957)

Born in Požarevac in 1872, the academician Živojin Djordjević belongs to the generation of scientists which lived and worked during the last decades of the 19th and the early decades of the 20th centuries. That period marked the beginning of scientific and cultural life in Serbia. Djordjević's name is inseparably connected with the development of Belgrade University, this being an important center of scientific education, and especially the development of biology and its applied branches.

At the time Djordjević was finishing secondary education, Belgrade College (Velika Škola) was at its scientific and teaching zenith. He studied natural sciences there, at the Natural Sciences and Mathematics

Department, and committed himself to studying zoology. After the death of the great naturalist Josif Pančić, and due to a shortage of zoology experts, lectures from this field were given by physicians. After graduating from College, Djordjević went to Geneva to defend his dissertation on zoology. He then went on to Berlin and Paris, to work in the laboratories of the well-known zoologist of the time – Schulze, Hertwig and Delage. His first scientific studies were published there. In 1898 he was elected professor of zoology at Belgrade College, and he also took over the running of the Institute of Zoology. It should be noted that scientific institutes within College at the time were mainly educational bodies with limited equipment and a very modest scope of scientific work. Djordjević was the first zoologist who received a modern education. He radically altered the teaching of zoology by introducing modern zoological disciplines and by initiating intensive scientific work, a true pioneering endeavour.

Like his predecessor Josif Pančić, Djordjević also explored Serbian fauna and much of his works on the subject represents important contribution to the knowledge about the living world in Serbia. He visited Macedonian lakes of Ohrid, Prespa and Dojran, unexplored up to that time, and studied the life in them. His extensive research into the ontogeny of the Golubac fly, a notorious agricultural pest, was of great significance as well.

In 1905, when College was upgraded into a university, even greater opportunities for conducting scientific work and teaching opened up to Djordjević. He introduced the subject of functional morphology in animals by inviting to University the young physiologist Ivan Đaja. At the same time, he himself unselfishly dedicated considerable energy to educating young scientists. His students Nedeljko Divac, Momčilo Ivanić, Borivoje Milojević, Siniša Stanković, Simeun Grozdanić, Branko Vlatković and some others became renowned biologists. These experts greatly expanded biological research in Serbia and Yugoslavia. Scientific activities of Živojin Djordjević were also bustling. The magnitude of his research, which lasted until the last days of his life and among other things included studies on parasitic protozoa, established him in the world of science as one of the world's leading experts on the subject of zoology.

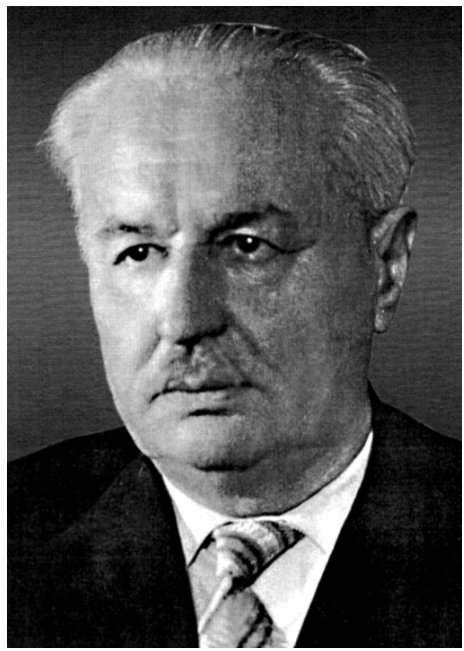
Živojin Djordjević's scientific work is prolific and complex. He was a co-founder of Medical School, the School of Veterinary Medicine, and the Faculty of Agriculture and Forestry. As a member of the Serbian Royal Academy (later the Serbian Academy of Sciences and Arts), he contributed a great deal to the founding of the Institute of Oceanography in Split, and the Institute of Hydrobiology in Ohrid. For many years he was president of the Yugoslav Biological and Yugoslav Entomological Societies in Belgrade, a member of the Yugoslav Academy of Sciences

and Arts in Zagreb, a member of the Czech Zoological Society and the Russian Shevchenko Academy. His connections with many scientists abroad helped the development of science in our country.

A person ought to be judged by historical criteria. The works of Živojin Djordjević represented a scientific breakthrough. He was a pioneer who laid the foundation for serious scientific investigations in Serbia and that is his greatest historical role. His colleagues will cherish Djordjević's legacy with the greatest gratitude and respect.

Academician Djordjević died in Belgrade, in 1957. The memory of Živojin Djordjević, the originator of Serbian biology, and a sincere, modest and erudite man, is being preserved by Belgrade University and the Serbian Academy of Sciences and Arts with affection and respect.

Author: *Ćurčić, Božidar*



Ilija DJURIČIĆ (1898–1965)

Ilija Djuričić was born in Belgrade, in 1898. He completed his elementary and secondary education in Belgrade. His education was interrupted during World War I, so he graduated from high school as late as 1919. The same year, Djuričić enrolled at the Biological Department of Belgrade University. However, immediately after the Medical School of Belgrade University was founded, Djuričić went there to study medicine. While still a student, he became an assistant to Richard Burijan, his physiology professor. He was the first student who graduated from the Medical School of Belgrade University in 1926. Four years later, Djuričić was appointed assistant professor of physiology at the same school. In

1936 he became a full professor and the Head of the Department of Physiology and Pathologic Physiology at the newly opened Veterinary School at Belgrade University. He served two terms as Dean of Veterinary School. During Germane occupation of Belgrade in World War II, he was interned in a concentration camp for several months and lost his position at the University. In order to survive, he was forced to practice medicine in a village in central Serbia, which was something he had never done before. After the liberation of Belgrade, Djuričić resumed his professorship at the University and again was elected Dean of Veterinary School for two terms. In 1947 he submitted to the Serbian Academy of Sciences a proposal for the setting up of a research institute for physiology of labour. The project was approved and Djuričić was appointed Head of the Institute for Physiology of Labour of the Serbian Academy of Sciences. He held the position and his university professorship until the end of his life. For two terms Djuričić held the office of Rector of Belgrade University. In 1950 Djuričić was elected corresponding member and in 1956 full member of the Serbian Academy of Sciences. In 1959 he became Vice-President of the Serbian Academy of Sciences, and President the next year. He died of heart attack in 1965, at the age of 66.

Ilija Djuričić published over 100 papers about the results of his experimental work in different fields of physiology such as: nerves and muscle physiology, cardiac physiology, biochemistry and metabolism, immunology and allergology, experimental haematology, experimental endocrinology and physiology of labour. His most outstanding achievements were the discovery of seasonal variation of neuromuscular excitability in the frog, and definitive denial of identity between experimental histaminic shock and anaphylactic reaction. Djuričić initiated multidisciplinary studies of problems of occupational medicine and its impact on the health of factory workers and miners.

Ilija Djuričić was an outstanding university teacher and science lecturer to both medical and laymen audience, and the author of three university textbooks, which had several reprints. He was also editor of a comprehensive *Medicine of Work* monograph, co-written by 50 authors. In 1947-1949 he was Editor-in-Chief of the leading Serbian medical journal *Serbian Archives of Medicine*.

Authors: *Pavlović-Kentera, Vera; Kentera, Dušan*

Slobodan DOBROSAVLJEVIĆ (1903–1980)

Slobodan Dobrosavljević was born in 1903, in Thessalloniki where, at the time, his farther worked as a secondary school teacher. He finished primary school and seven years of secondary education in Kruševac and completed the final year in Belgrade, in 1921. He enrolled at the Technical Faculty in Belgrade, Department of Mechanical and Electrical Engineering, for the 1921/22 term which was the first regular school year after World War I. He was particularly interested in petrol engines. The subject of his graduation project and the thesis was airplane engines. He received his degree in 1926, while the Airplane Engines Factory in Rakovica was still under construction and which probably had affected his choice of study subjects. Slobodan

Dobrosavljević was the first Serb ever who graduated on the subject of internal combustion engine in Serbia. A few other Serbs who had graduated in the same field before him obtained their diplomas abroad, primarily in Germany and France.

When in 1928 the Airplane Engines Factory in Rakovica was completed and job vacancies for mechanical engineers announced, Slobodan Dobrosavljević had already been working with an engineering bureau. A few years later, he became the head engineer. The main job during this period was developing production technology of the parts for radial engines with air cooling systems based on the designs by the French manufacturer Gnome&Rohne. After the technology was successfully developed and the serial production of engines began, Dobrosavljević started studying original engine construction in much greater detail, paying particular attention to occasional faults occurring in parts which affected the safety of engine operation while the plane was in the air. Based on his findings, it was agreed that certain restructuring of engines was necessary. He suggested three types of reconstruction works which the G&R factory accepted and included in a serial production. One of major contributions that manifested while he was working at the factory was a project design for the anti-acoustic test station with two aero tunnels for simultaneous testing of 600HP and 1200HP airplane engines which was built as part of the factory complex and put in operation in 1939. He worked at the Airplane Factory until 1943 when he was forced to leave it because he fell out of favour with the German management because of disloyalty he was expressing towards them while the factory was being prepared to do engine repair works on German war planes.

During his years at the Rakovica Factory, the potential of Slobodan Dobrosavljević was not utilized only in the area of engine production. He was also able to work on the developmental of internal combustion engines and do other related research works. In 1933 he designed and organized the production of the prototype of the two-cylinder explosion engine with water cooling system and horizontally opposed-cylinder engine, with 18HP and 3000 r/min that were to be assembled into a fire prevention mechanism used for operating water pump. That was the first engine of this type designed and produced in Serbia. The final testing was carried out in 1934 and its serial production at the Rakovica Factory started after World War II and lasted until 1948.

Slobodan Dobrosavljević was elected senior lecturer at the Belgrade Technical Faculty, Department of Mechanical and Electrical Engineering. He also gave lectures on light engines (part of airplane engines) at the Department of Steam Engines and Internal Combustion

Engines. After World War II, he chose to stay at the Faculty. In 1948, certain departments of the Technical Faculty acquired the status of independent faculties while the Mechanical and Electrical Engineering Department branched into two separate faculties: the Faculty of Mechanical Engineering and the Faculty of Electrical Engineering. Slobodan Dobrosavljević moved to the Faculty of Mechanical Engineering that same year.

In 1947 senior lecturer Slobodan Dobrosavljević became an associate professor at the Faculty of Mechanical Engineering of Belgrade University. In 1950 he was elected corresponding member of the Serbian Academy of Sciences and in 1961 he became its full member. Between 1965 and 1971, he was Secretary at the Technical Sciences Department at the Serbian Academy of Sciences and Arts.

Aware of the growing importance of Diesel-engines which, being economical, became very widely used in motor vehicles and agricultural machinery, Prof. Dobrosavljević dedicated his time to doing more research on Diesel-engines although as a lecturer he remained loyal to his favourite subject of airplane piston type engines until he retired. In 1947 he published results of his theoretical research work and also made public a new design of fuel oil injector for modern high-speed Diesel engines which put the old injectors out of use.

His most important contribution was related to the design of a new Diesel-engine for motor vehicles that would be more economical, reliable, safer, environment friendly unlike engines that were in massive production at the time. Prof. Dobrosavljević patented the design of his *two-cycle engine with air cooling system*. This is a classic type of a two-cycle engine with uniflow scavenging and a single exhaust valve in the cylinder head where the following changes occurred: a) the cylinder head, with cooling ribs on the outer surface, had an air duct built in and connected to the exhaust pipe through which air for internal cooling of the cylinder head and the exhaust valve seat is circulating thus considerably lowering thermic pressure on the cylinder head walls, and of the seat and the head of the valve, b) a fixed combustion chamber was built in the cylinder head where the air-fuel mixture is being made by fuel film evaporating from the chamber walls which is formed there by tangential injection of fuel in the direction of air rotation, c) working temperature of the chamber is maintained by the *autothermic regulation* at the level required for full and quick evaporation of fuel film both under low load but also under full load.

Characteristics of this type of engine were tested and certified in an experimental single cylinder engine which served as the basic design for

the prototype of a four-cylinder engine that was to be industrially produced and used for trucks and buses. Sadly, the research work and the necessary final optimization of this type of engines were discontinued after Slobodan Dobrosavljević died in 1980.

Author: *Trifunović, Radivoje*

Petar C. DREZGIĆ
(1914–1980)

Academician Prof. Dr. Petar Drezgić was born on May 29, 1914 in the village of Jamena, municipality of Šid, to a farmer's family. He completed his primary schooling in his native village. He went to primary school in the town of Brčko, and in 1934 he completed his secondary education in the town of Šabac. He graduated from the Faculty of Agriculture in Belgrade, in 1938, with the average mark of 9,3.

After University, he did his compulsory interim placement at the Faculty of Agriculture and Forestry in Belgrade, the Institute of Genetics and Plants Selection. He was elected assistant at the Institute of Agriculture of the Faculty of Agriculture and Forestry in 1939.

Soon after the downfall of fascism in 1944, he became manager of Crvenka, an experimental centre at the Faculty of Agriculture in Belgrade. On January 1st, 1947 he was appointed director of the Faculty's experimental centres. Along with this job he also worked as an assistant at the same Faculty. In January 1948 he was elected lecturer for the subject of special farming. On May 1st, 1950, at his own request, he was transferred to the State Ministry of Agriculture.

In April 1951 he accepted the position of the director at the Institute for Agricultural Research in the town of Peć, in Kosmet. While on this job, he wrote and defended his doctoral thesis *Preparation of Moulds on Ashy and Brown Forest Soil of Northern Metohija* at the Faculty of Agriculture in Belgrade in 1956.

On February 1st, 1957 he was elected professor extraordinaire at the Faculty of Agriculture in Novi Sad, for the subject of special farming. On January 1st, 1958 he was appointed part-time director of the Institute of Agriculture and he stayed on the job until September 1968. Petar Drezgić also became a full professor for the subject of special farming at Novi Sad Faculty of Agriculture on October 21st, 1961 where he remained until his death, on October 12th, 1980.

Along with his professorial duties, he was also deputy Dean of Novi Sad Faculty of Agriculture, between 1962 and 1964, and also between 1967 and 1969. Between 1964 and 1967 he was Dean, whereas between 1971 and 1975 he was the Head of Novi Sad University. In 1979 he became a full member of the Vojvodina Academy of Sciences and Art (VASA) in Novi Sad.

He spoke excellent Russian and English. Out of his happy marriage came two sons, Branko and Vladimir.

As a scientist, Prof. Drezgić was very much respected and that is why so many graduate engineers of agriculture came to work with him on their specialist's papers, master's degrees and doctoral thesis. Thus, 5 specialist's papers, 19 master's degrees and 18 doctoral theses were defended under his mentoring.

Prof. Drezgić was among the first people to realize the necessity of educating people directly involved in agricultural and farming production, and everybody else working in specialist services around Vojvodina, which is considered the beginning of a permanent education. Together with other leading professors and scientists at the Faculty of Agriculture and the Institute of Agriculture in Novi Sad, he initiated the idea to run winter courses for agronomists. The first seminar was organized in 1967 and has been running regularly each year ever since. Thousands of agronomists who attended those seminars agreed that they were needed and ought to be continued.

Prof. Drezgić took part in 14 seminars, organized between 1967 and 1980, at which he gave 35 memorable lectures on agroecology, agrobiology and agrotechnique of main arable crops.

His scientific and professorial activities were numerous and very comprehensive, consisting of 106 scientific and 47 technical papers, published in local and foreign periodicals. He authored four university textbooks on special farming and eight brochures and popular technical publications.

Prof. Drezgić was participant at numerous scientific congresses and symposiums abroad as well as in his own country, each time with an outstanding paper. He participated in 17 international congresses, symposiums and scientific conferences, where he submitted 22 papers, and at 12 local ones at which he appeared with 20 papers.

All of these papers are included in congress documentation and in his comprehensive bibliography.

During his lifetime Prof. Drezgić went on several specialist and study visits abroad. He visited the US on three occasions. In 1954 he spent there seven months doing research in the selection and production of seed corn; in 1961 he studied organization of post graduate studies at faculties of agriculture for 30 days and in 1977 he spent another 30 days working on a joint project entitled *Development of Corn Production in the US* (UNDP project).

He undertook study tours lasting between 7 and 30 days in Italy, France, Bulgaria, Poland, the then USSR, Czechoslovakia and East Germany.

Prof. Drezgić was on the managerial board of international organizations such as the International Centre for Agricultural Research (CICRA) and the International Association for the Study of Land Farming (ISTRO).

He also represented Yugoslavia (the SFRY) at FAO (Food and Agricultural Organization) and COMECON (Council for Mutual Economic Assistance) meetings.

He led part of the international research project entitled *International Long Term Experiments with Nitrogen* (ISDV), still being carried out in several European countries, and the international project COST 66/67 (nitrate-humus-soil) under the auspices of the European Union in Brussels.

Prof. Drezgić initiated scientific and technical cooperation within agricultural institutions on the territory of Vojvodina and Macedonia, the aim of which was to apply scientific results and achievements directly into agricultural production. With great resolve he visited firms, agricul-

tural production centres, where he checked the crop, gave advice, held lectures and consultations. Regardless of weather conditions or difficulties in working circumstances he was always there to help.

Because of such attitude, agronomists involved in direct production always listened to him with keen interest, attention and utmost trust. Petar Drezgić was not a cabinet type of scientist but a researcher who did experiments and who, soon after checking the findings of his tests, applied the results in production.

His assistants in agricultural institutes in Peć and Novi Sad, but also in various agricultural firms in Vojvodina, enjoyed his attention and concern, and were always advised and encouraged by him to continue their education at post graduate level, to learn foreign languages, and to try gain and expend experience at home but also abroad.

He cared very much about his students, nearly as much as he did about his own children, and was very strict but fair, demanding knowledge of them and showing no unnecessary lenience. Students reciprocated friendliness and respect. That is why many of them wanted him for the mentor while working on, and defending, their final paper on the subject of special farming. Some 200 students obtained their diplomas in this field.

Beside science and teaching, Prof. Drezgić's interests and involvements included political and social issues. He was a Federal Assembly MP, member of the Managerial Board of the Federal Council for Financing Science, member of the Executive Council Committee for Science and Technology, president of the Agricultural Association of Engineers and Technicians of Kosovo and Vojvodina, and held many other positions. He performed all of his duties devotedly and dutifully.

Prof. Drezgić was awarded as many as 24 high state honours for his hard, creative and dedicated scientific work and for his contributions to the development of agricultural production in Yugoslavia, primarily in Vojvodina.

Author: *Spasojević, Boriša*

Vladimir V. FARMAKOVSKI (1880–1954)

Academician Vladimir V. Farmakovski was born on October 21, 1880 in Simbirsk, Russia. He completed his machine engineering studies at the Faculty of Mechanics of the Institute of Technology in 1903, in Petrograd. After finishing the military service, he worked in the construction department at the Hanomag locomotive factory in Germany. He later returned to Russia where he worked as a constructor at Lessner and Co., the steam engines manufacturer, in Petrograd and afterwards he worked at the Petrograd-Moscow State Railways Head Office which was in charge of fitting in and testing their own steam over-heaters.

In 1909 he was elected assistant lecturer at the Kiev Polytechnic Institute. In 1911, after defending his thesis, equivalent to a doctorate, he became an assistant in the subject of applied mechanics. In 1912 he was appointed associate professor, and two years later a full professor at the Applied Mechanics Department, locomotive section. He remained at the Institute until the end of 1919.

Prof. Farmakovski lived in Belgrade from 1920. In 1922, as an expert and a former Kiev Institute professor, he was assigned a professorship at the Belgrade Technical Faculty. From 1948 he lectured the subjects of locomotives, mechanical engineering, railway engineering plants and machine parts.

He became a full member of the Serbian Academy of Sciences and Arts in 1948 and at the same time was elected secretary of the Technical Sciences Department at the Academy. He became the Head of the Institute of Mechanical Engineering after it was founded in 1947. Following his death, while at work, on June 5, 1954 the Institute was named after him, out of respect for his contribution to science and the Academy, and is now known under the name of *The Vladimir Farmakovski Institute of Mechanical Engineering*.

The main areas of his scientific and professional work included the theory, construction and experimental research of thermic processes in locomotives. His most important scientific contribution was the making of steam overheater, one of the most important components of the locomotive. During the development phase of the work on the steam overheater, Prof. Farmakovski was first to experimentally and theoretically describe thermic processes in steam overheater.

Prof. Farmakovski submitted to the Institute of Mechanical Engineering of the Serbian Academy the results of his research work which comprised methods of calculation, a number of constructional solutions and their features, and he also determined the size and the temperature of steam on exit as the main quality pointer. Pictures nos. 4 and 5 show the construction process of the overheater bearing the marking *MISAN-F.* With his new ideas and the introduction of the subject of theoretical analysis, Farmakovski presented himself to Europe as an extraordinary expert and scientist.

His contribution to science and profession is visible in his numerous research works. He analysed the efficiency of thermal energy and determined the degree of its utilization in relation to fuel consumption, the amount of produced steam, the cost of fuel and manpower, and certain other requirements. Numerous theoretical and experimental tests helped solve the problem of the combustion of coal of lower thermal energy by

application of a new appliance called Erdelji-Farmakovski which led the air from out side into the fire area above the combustion layers. Using a number of experimental data from his research work for solving the problems of dehumidification of moist steam on entering the overheater and with the reduction of certain amount of heat from hot gases, Farmakovski devised a mathematical method for establishing temperature of overheated steam. Besides, he elaborated on the process of separating moisture and also produced a simple construction for mechanical separation of water. Having analysed significant factors relevant to heat loss, Prof. Farmakovski constructed a cleading that was composed of several layers of air separated by certain materials which prevented heat from being lost into the atmosphere due to the boiler radiation. Experimental testing produced positive results. The results of his own research, and all significant findings by scientists and experts from the field of engine thermo-techniques, are obtainable from Farmakovski's monograph *Thermo-techniques of the Steam Engine.*

Farmakovski's scientific contribution is apparent through his experiments by which he determined the load, stress and deformities of boiler elements and of sheets but also their connections through tension and anchor bolts. Depending on the sheet temperature and using corresponding equations, Prof. Farmakovski determined the level of distribution and the size of sheet tension as well as its deformities and also proposed measures which could help reduce tension. He identified states of stress and bolt deformities caused by steam pressure in the boiler and by the difference in the level of shifting of outer and inner sheets of the boiler. Having established the deviation, he formulated an equation for calculating tension in relation to the temperature of boiler sheets and other parameters. With the introduction of a spherical joint between the anchor bolt and the base of the sheet, and the disc springs under the nut of the bolt, Prof. Farmakovski gave a valuable contribution to the reduction of tension in anchors.

Based on the findings pertaining to drawbacks of the previous methods of calculating the tensile force in the engine, Prof. Farmakovski made new proposals. Apart from determining optimal tensile force on the periphery of the wheel based on the recognized size, he introduced a new element – establishing the limit value of the tensile force in relation to the capacity of the stoker and giving a corresponding equation for its calculation.

The railway transportation cost analysis helped with the devising of the most suitable relation between the tensile force and the power in relation to speed, weight, number of carriages, and coal consumption. Farmakovski also determined the speed dependence on the degree of

ascent and the stoking regime. Prof. Farmakovski facilitated the building of the railway network in the period after 1918 by using his methods for establishing the efficacy of railway transportation, primarily in parts where the tracks ascend.

Prof. Farmakovski's impact on science and profession is manifest in his pedagogical work at University in which he was engaged from 1908 until his death, and in his lectures and books on engines, steam boilers, and machine elements. His lectures were based on the latest scientific information, enriched with his personal knowledge and experience as a constructor. Farmakovski's approach to, and the knowledge of, engines is presented in his books and literature for engineers and students. His early textbooks *General Theory of Engines, Steam Engines-Engine Boilers* and *Steam Engines-Engine Stern* offer theoretical knowledge and instruction on how to apply it in construction of engines and their parts, with additional drawings of the finalized constructions. The second updated edition of *Engines - General Part* was published in 1941 in collaboration with his assistant D. Vitas. In 1947, Prof. Farmakovski also wrote a very comprehensive textbook entitled *Steam Engines*. Another excellent textbook of his, *Machine Elements - General Part - Introduction to the Construction of Machine Parts,* was written in 1940.

Author: *Savić, Zoran*

Bogdan GAVRILOVIĆ (1864–1947)

Bogdan Gavrilović was born in Novi Sad on January 1, 1864. Top of the class in his generation, after completing secondary education he was sent by *Tekelianum* (a Serbian educational institution) to study at the Philosophical Faculty of the University in Budapest, where he obtained a Ph. D. in mathematics in 1887. In the same year he was appointed professor at Belgrade College which was upgraded and renamed the University of Belgrade in 1905. He lived in Belgrade until his death in 1947, active as a university professor until 1941. Before the turn of the century, Gavrilović had published two voluminous university textbooks which had the character of monographs: a 900-page *Analytical Geometry* (1896) and *The*

Theory of Determinants (1899) about linear algebra. Both works may be considered capital works in the field of mathematics in Serbia. Academician Radivoj Kašanin thus wrote of the two books: *Both, especially the latter, would be an honour to any nation. Many countries, at that time more powerful and luckier than us, could not boast of such works.*

For a whole decade at the beginning of the 20th century, Gavrilović was busy mostly with scientific subjects, publishing a score of excellent treatises, mainly in the periodical *Glas* of the Serbian Academy of Sciences, and *Rad* of the Yugoslav Academy of Sciences and Arts in Zagreb. He was interested in algebra (theory of numbers and linear algebra), analytical geometry and theory of functions. He was elected member of the Serbian Academy of Sciences in 1901 and of the Yugoslav Academy of Sciences in 1906. He later expanded his interest into foundations of mathematics.

Prof. Gavrilović was an excellent organizer of work at Belgrade University and the Academy. His professional achievements helped the College become upgraded into the University of Belgrade and subsequently, during his office as the Rector, the level of teaching was elevated and university's development promoted. Also, he was elected president of the Serbian Academy of Sciences for three terms (1931-1937). In 1894 he founded the mathematical library within the Mathematics Department which, unfortunately, was destroyed at the end of World War II. He shares the credit with Mihailo Petrović and Milutin Milanković for introducing modern mathematics into Serbia at the beginning of the 20th century in Serbia.

Academician Gavrilović performed many important scientific and social functions and received a number of high honours. In addition to those mentioned above, he was a member of *Circolo matematico di Palermo, doctor honoris causa* of the University of Athens, president of *The Nikola Tesla Society,* and director of *The Nikola Tesla Institute.* He was also a co- founder of the Mathematics Institute in Belgrade (1946).

Bogdan Gavrilović was an eminent educationalist and a cultural activist with strong views on many important issues concerning the nation's life, its politics, history and philosophy. Of universal spirit, he did not take a narrow view of his science but regarded it in the light of other sciences and culture in general. Supporting this are his numerous lectures, speeches and writings. As a member of the elite Belgrade circle of intellectuals, he helped create a special atmosphere thanks to which Belgrade became one of the centres of scientific work.

Author: *Mijajlović, Žarko*

Ljubiša M. GLIŠIĆ
(1888–1987)

Prof. Ljubiša Glišić was born on June 12, 1888 in Kraljevo, Serbia, as the second son of the schoolteacher Mihajlo, and his wife Milka. He attended the primary school in Kraljevo, and then finished secondary school in Kragujevac, in 1908. His father died in 1892, leaving a widow with three sons on a pension which was hardly enough to live on. Being an excellent pupil, Glišić was granted help in money, clothing and books from the school fund. His youth was marked with activities in two different fields. First was his participation in the Serbian social – democratic movement, and second was music. While he abandoned active political work after World War I, music has remained

a great preoccupation in his life. He was a talented violoncellist who played in *Collegium musicum,* an amateur chamber orchestra of Belgrade University between the two wars.

Glišić studied biology at Belgrade University between 1908 and 1912. He taught at secondary schools for a while, but the Balkan Wars (1912–13) and World War I (1914) took him away from his duties. As an artillery lieutenant of the Serbian army, he retreated through Albania in 1915. From the Thessaloniki front he was appointed aide-de-camp of the Serbian military attaché in London, where he stayed until the end of the war. During his stay there, he was admitted to the Botany Department of the Imperial College of Science and Technology.

In 1922 Glišić was apointed assistant at the Faculty of Philosophy, in the Botany Department, headed by Prof. Nedeljko Košanin. His dissertation dealt with the embryology of two endemic, tertiary relicts, *Ramonda nathaliae* and *R. serbica* (*Gesneriaceae*). After defending the Ph.D. thesis in 1923, he became assistant professor in 1924, associate professor in 1930, and full professor in 1939. After the death of Prof. Košanin (1934), he became the Head of the Botany Department and Editor of the *Bulletin de l'lnstitut et de Jardin botaniques de l'Universite de Belgrade*.

At the beginning of World War II, Glišić was taken prisoner and spent four years in Oflag XIII B, in Germany. He returned to Belgrade in 1945 and found half of the Institute destroyed, including the lecture hall, all microscopes and instruments. Four generations of students, however, were registered for biology and he had to put great effort into organizing teaching and practical work. He taught all botany subjects to the first, and a few subsequent generations, but after a while he only taught plant physiology. During 1946/47 academic year he was elected Dean of the Faculty of Philosophy. In the period between 1950 and 1952 he served as the Vice-rector of Belgrade University. Although he retired in 1958, at the age of 70, he continued teaching for almost ten years at the newly founded faculties in Novi Sad, Priština and Sarajevo. He also gave lectures in cytology and developmental physiology to postgraduate students in Belgrade. At that time he wrote two excellent textbooks on cytology *Elements of Cytology* and *General Cytology,* which were very well received. Glišić died in January 1987, aged nearly 99.

The scientific work of Prof. Glišić entails studies in the field of plant embryology. More precisely, he tried to use embryological data in taxonomy, and to establish evolutionary relationships between genera and families. He investigated the development of the female gametophyte, embryo and endosperm of the plants belonging to the former order *Tubiflorae*. The four families, *Gesneriaeceae, Scrophulariaceae, Orobanchaceae*, and *Bignoniaceae* were not clearly distinguished, and

the phylogenetic relationships had not been unequivocally established. The following main topics of his investigations can be singles out:

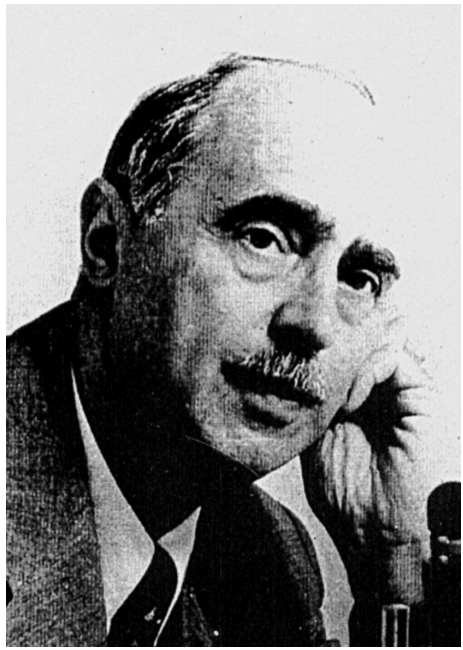
a) Studies in the embryology of the Balkan endemic species and other genera of the *family Gesneriaceae*, including *Ramonda nathaliae* and *R. serbica, Haberlea rhodopensis,* and *Roettlera.* These studies, included in his dissertation and other related papers, were very well received by the leading world embryologists of that time and were referred to many times in most outstanding international textbooks and monographs.

b) Determination of the systematic position of the *family Orobanchaceae*, and its close phylogenetic relationship with the *family Scrophulariaceae*. The results were based on the developmental study of the endosperm haustoria in *Orobanche,* which had previously been misinterpreted. Glišić ascertained that *Orobanchaceae* represented a continuous series with the parasitic forms of *Scrophulariaceae* and suggested to merge the two families. Several investigators confirmed his data and used his results as a good example of the importance of embryology to phylogenetic systematization.

c) Embryology of certain genera belonging to the *Scrophulariaceae* and *Solanaceae*, which could form a bridge between these and the related families. These studies include the embryology of *Lathraea squamaria* (*Scrophulariaceae*), which was close to *Orobanche* (*Gesneriaceae*), *Gratiola officinalis*, possibly related to *Haberlea* on the one hand, and to *Lentibulariaceae* on the other. Among the *Solanaceae*, he studied various developmental types of cellular and nuclear endosperm. Finally, he proposed an evolutionary pattern of the related genera, which stirred great interest among embryologists and remained relevant, in its main points, to the present day.

a) Prof. Glišić was the first botanist who initiated a new method of research at the Institute of Botany. In his investigations of the flora, he approached unsolved problems in a new way. During the last years of his active life, when he no longer could do laboratory work, his interest switched from developmental morphology (embryology) to experimental botany. He insisted on paying much more attention to studying plant physiology and biochemistry and, through his teaching, placed these branches of botany at a high theoretical level. With the mind open to new scientific trends, the undying eagerness to be informed of new achievements, the critical eye for misconceptions and superficial conclusions, and the willingness to share his knowledge with others, Prof. Glišić created a highly commendable legacy.

Author: *Nešković, Mirjana*



Jovan HADŽI
(1884–1972)

The most distinguished Yugoslav biologist and one of the outstanding zoologists-evolutionists of the 20th century, Dr Jovan Hadži, an academician and a long serving professor at the Universities of Ljubljana and Zagreb, was born in Timişoara, on November 22, 1884; the son of father Pavle (a Serb from Timişoara) and mother Anka, née Krstić. Hadži's grandfather was an orthodox priest in Timişoara. Dr Jovan Hadži was married to Đurđica, née Petrović; they had two sons: Aleksandar (1912) and Dušan (1921).

Hadži completed his elementary and secondary education in Zagreb; in 1903 he enrolled at the Faculty of Philosophy of Vienna, where

he graduated in 1907. At the same University, in May 1907, he defended his doctoral dissertation entitled *The Nervous System of Hydra.* The same year he was appointed research assistant at the National Museum in Zagreb and afterwards assistant at the Institute of Comparative Anatomy, the Faculty of Philosophy of Zagreb University. As early as 1913, he was elected *Privatdozent*. Once the University of Ljubljana was founded, Hadži was appointed associate professor (1920), and full professor of zoology in 1921. He headed the Institute of Biology of the Slovenian Academy of Sciences and Arts until 1968.

Jovan Hadži was a zoology professor at Ljubljana University for 37 years (1920-1957), whereas his scientific career lasted much longer, 65 years in full (1913-1972). This extraordinary pedagogue and scientist produced the first and most beautiful texts about the history of Ljubljana University. Not only do the present-day, but future university experts, too, will speak and write about the immense scientific opus and achievements of Jovan Hadži, and his exceptional personality. He left, on a global level, indelible marks which paved the way for further development of a number of scientific disciplines, and created conditions for University wor-kers to preserve and promote acquired reputation and activities. Jovan Hadži was awarded an honorable Ph.D. from Ljubljana University (1969) for his extraordinary achievements in launching biological studies there and for bringing that University to great prominence, both at home and abroad.

As a man of great erudition and a great expert in evolutionary morphology, systematization, ontogeny, biogeography, paleontology and ecology, Hadži focused his attention to studying the origin of varying marine, freshwater and terrestrial animals. Based on Hadži's synthetic interpretation of animal phylogeny, he improved his well-known *Turbellarian Theory of the Cnidaria*, which completely revolutionized Ernst Haeckel's system on the origin and development of multicultural organisms. This important study placed an emphasis on phylogenetic problems and their solving. It also tackled a detailed reconstruction of genealogical tree (i. e. the system of classification) of animal world on the basis of comparative principles - morphological, ontogenical and ecological. In fact, the works of Prof. Hadži included three main areas of research: taxonomical-comparative-morphological-ontogenic; zoogeographical-ecological; and phylogenic-evolutive. The research results were presented in more than 900 reports, scientific papers and monographs, and published in many local and foreign scientific bulletins.

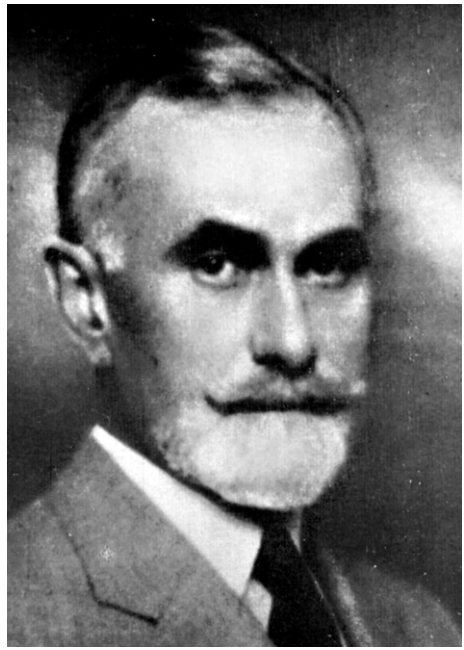
Hadži received numerous rewards and honours for his outstanding achievements in biological science. He was a member of the Slovenian Academy of Sciences and Arts (1938), the Yugoslav Academy of Sciences and Arts (1920), the Serbian Royal Academy (1936), the Czechoslovakian Academy of Sciences (1970), a corresponding member of the Association of Physicians of Croatia, Slovenia and Međumurje, president of the Slovenian Trust for the Study of Flora, Fauna and the Earth, a member of the Yugoslav Committee within the International Commission for Scientific Research of the Mediterranean, an honorary member of the Natural History Society of Slovenia (1954), a member of the Society for the Study of Caves and Pits, and of the Society for the Advancement of Seamanship of Yugoslavia. Hadži also was a long-term director of the Institute of Biology, the Slovenian Academy of Sciences and Arts, and the head of the Natural-Mathematics Department of that Academy, Editor-in-Chief of the publication *Razprave IV razreda* of the Slovenian Academy of Sciences and Arts, a member of the editorial board of the *Bulletin scientifique*, as well as a member of the Scientific Council of the Institute for Karst Research of the Slovenian Academy of Sciences and Arts. Hadži's numerous scientific studies and his remarkable success won him recognition from the Government of the Federal National Republic of Yugoslavia (1949). He was also the recipient of *the Prešern Award* (1956), *the Kidrič Award for life-time achievements* (1963), *the Levstik Award* (1971), and *the AVNOJ Award* (1967). For all his contributions to the development of biology he was awarded *the Order of St. Sava of the 3rd Class*, *the Yugoslav Crown Order, the Medal of Labour* and *the Medal for Merits with the Gold Star.*

Hadži's hypothesis, according to which the oldest multicellular animals had developed from unicellular, or multinucleate and bilaterally symmetrical animals, is chiefly based on the comparative-morphological analyses, individual developmental features and hypothetical relationships of such organisms with their environment (a more contemporary approach than that of Haeckel). Besides, one of Jovan Hadži's most fundamental contributions to modern biology rests on the fact that he was among the first evolutionists who regarded multicultural animal's phylogeny from the standpoint which involved neither recapitulation nor inheritance of acquired features.

Hadži's concept of the phylogeny of metazoans significantly contributed to re-evaluation of all the theories and hypotheses proposed ear-

lier by other authors, primarily because his clearly presented and logical system of the animal world is much closer to a real natural system of classification of living beings. It is worth mentioning that a modern collection at the British Museum (Natural History) in London has been arranged based on the genealogical tree so successfully devised by Jovan Hadži.

Authors: *Ćurčić, Božidar P. M.; Fabjančić, Marija S; Karamata, Ozren S.*



Jakov MATVEJEVIČ HLITČIJEV (1886–1963)

Jakov Matvejevič Hlitčijev was born on November 29, 1886, in Nahičevan, on the river Don (in the former Soviet Union). He was Armenian by nationality. In 1919, during the Revolution, he left Russia and reached Belgrade in 1920, where he lived until he died in 1963.

J. M. Hlitčijev attended High School in Rostov-on-Don, which he completed in 1904. He was awarded a gold medal for his academic achievements at school. Between 1904 and 1911 he studied at the Petersburg Polytechnics Institute, where he graduated from the Shipbuilding Department in 1911. He spent some time at the High Technical School in Berlin. Upon graduation, he worked in a ship buil-

ding bureau and at the Petersburg Polytechnics Institute at the same time. In 1912 he was first elected assistant and then lecturer at the Institute for the subject of shipbuilding mechanics. In 1918 he left Petersburg to join the Institute of Polytechnics at Herson-on-Don where he was elected associate professor. He stayed there until 1919.

In 1920 J. M. Hlitčijev was appointed part-time professor at the Technical Faculty for the subjects of mechanics, hydraulics and graphostatics, which marked the beginning of his career at Belgrade University. In 1922 he became an associate professor and taught the strength of materials at the Technical Mechanics and Thermodynamics Department within the Technical Faculty. The department was headed by Prof. Ivan Arnovljević. It was not before 1928 that Prof. Hlitčijev was a full-time employee of Belgrade University. He was appointed to the post of full professor for the subject the strength of materials in 1937. Prof. Hlitčijev's professional activities at Belgrade University lasted until 1957 when he retired but, nonetheless, continued lecturing the theory of elasticity at the Faculty of Civil Engineering.

His first four works were published while he was in Russia. Between 1919 and 1927, an interruption in his scientific activities occurred. After these were resumed, he had three more works published in the period between 1927 and 1932. A fruitful career lasting for almost thirty years followed. It was a period of Prof. Hlitčijev's full scientific maturity during which he published additional 36 works. It is worth mentioning that in 1926 Prof. Hlitčijev published a book entitled *Science on Strength of Materials* which contained elements of the theory of elasticity. At the time it was published, that book represented a major breakthrough in the theoretical education of future generations of mechanical and civil engineers.

Scientific activities of Prof. Hlitčijev fall into six areas: *General Issues of the Theory of Elasticity; Torsion; Bending of Beams, Beam on Elastic Supports, Beams on Cross-Girders; Plate as Planar Problem and as Problem of Bending; Stability of Equilibrium of Beam Systems and Plates; Works on Strength of Ship Structures.*

Between 1926 and 1963, Prof. Hlitčijev published nine books, mainly on the subjects of the strength of materials and the theory of elasticity. One of these books concerning ship structures was published posthumously (1973) and is in active use even today. Prof. Hlitčijev translated eight books.

Prof. Hlitčijev was a very active scientist. He advocated the setting up of the Mechanics Department at the Faculty of Natural Sciences and Mathematics in Belgrade which opened in 1953. His initiation for

the foundation of the Yugoslav Society for Rational and Applied Mechanics was followed up and finalised in 1954. He was instrumental in the setting up of the Shipbuilding Department at the Faculty for Mechanical Engineering. For a number of years, Prof. Hlitčijev actively participated in the working of many scientific institutions, editorial boards of domestic and foreign scientific journals while maintaining numerous personal and professional contacts with other scientists from the world of mechanics.

Prof. Hlitčijev was elected full member of the Serbian Academy of Sciences on June 10, 1955 in recognition for his exceptional contribution to the development of science. In 1958 he received the highest state honour – *the 7th July Award*.

Author: *Naerlović-Veljković, Natalija*

Milan ILIĆ
(1903–1991)

Milan Ilić, the scientist whose work is viewed as a foundation stone of applied petrology in our country, is rightly regarded as one of Serbia's leading petrologists in the period after World War II.

He was born in Belgrade, in 1903. He finished elementary school in Kragujevac, and secondary in Belgrade and Novi Pazar. He graduated from the Faculty of Philosophy, the Geological Department, in Belgrade.

After graduation, he took a teaching position at Bitolj Grammar School, Macedonia, where he also studied rocks of Perister. The first works of Milan Ilić relate to petrographic-mineralogical study of the rocks of that region. In 1929 he was transferred to Kragujevac Grammar School and in 1935 he moved to Belgrade where he was offered employment at

the Geological Institute of the Kingdom of Yugoslavia. In 1936 he was appointed part-time assistant at the Technical Faculty in Belgrade, Department of Technical Geology, Mineralogy and Petrography. During 1936 he did his specialist studies in Ljubljana. He was acquainted with Fedorov's methods for mineral testing (universal stage) and many other procedures, entirely new in those days. Thanks to the implementation of those methods, the Geological Institute became Serbia's main center for optical study of minerals and rocks.

At the beginning of World War II, Ilić was mobilised and taken prisoner-of-war at Osnabrück war-camp. After the war, he returned to his country and accepted the post of an associate at the Geological Institute within the Yugoslav Ministry of Mining. In 1947 he was appointed associate professor at the newly established Mining Department (subsequently Faculty of Mining) of the Technical High School whereas in 1950 he became full professor for the subject of theoretical and systematical petrography. He was a very active member of the Serbian Geological Society which he presided over during 1973.

For a number of years, Prof. Milan Ilić was a permanent adviser at the Serbian Institute for Geological and Geophysical Research, in charge of study projects on non-metallic mineral raw materials.

He retired in 1973, and died in 1991.

Prof. Milan Ilić gave considerable contribution to our petrology and geo-sciences in general, promoting and spreading its popularity. He devised new approaches to the study of magmatic and metamorphous rocks by applying modern methods. His study of non-metallic mineral raw materials is of special importance as, up till then, it was considered a pure technical problem. His petrological study produced a key to the solution of genesis of raw materials. Thus the foundations of applied geology were laid. Some of the best works of Prof. Milan Ilić are in the field of non-metallic raw materials, especially magnesite. Many foreign scientists quoted the works of Milan Ilić and accepted his explanation on the genesis of sedimentary magnesites (G. Hiessleitner, F. Schumacher, A. Cissarz, M. Donath, J. P. Destombes, and others). A Mars crater, with sedimentary hydromagnesit deposits, bears the name of *Bela stena - White Rock* after a deposit studied by Prof. Ilić. His scientific achievements brought him the highest state honour - *the 7th July Award*. He also received numerous awards at home and abroad in recognition for his successes.

Of special importance are his works pertaining to propilitization and postpropilic alterations, the study of mineral deposits, and Tertiary volcanics across Serbia.

He was deeply devoted to his pedagogical work. His first textbook *Geology for Miners – Mineralogy and Petrography* was of great educational importance for a long time. During his first years at the Faculty, Prof. Ilić conducted almost all laboratory experiments, sometimes very late in the afternoon. At such times, he would tell anecdotes from his field trips to his students in order to perk them up.

Authors: *Knežević-Djordjević, Vera; Karamata, Stevan*

Stevan JAKOVLJEVIĆ (1890–1962)

Stevan Jakovljević was born in Knjaževac, on December 9, 1890 into a family of civil workers. He completed his elementary and Grammar School in Kragujevac, where his father was employed. He studied biology at the Biological Department of the Faculty of Philosophy, University of Belgrade, in 1913. He was appointed assistant teacher at Kragujevac Grammar School, after which he held a similar position in Belgrade.

His career was interrupted by World War I. He was very active, as an artillery officer, throughout the war. After it ended, he was appointed assistant for the subject of botany within the Committee for Botany and the Botanical Garden in Belgrade. He defended his doctoral dissertation

entitled *Cystoliths in family Boraginaceae,* in 1925. In 1929 he was elected assistant professor, in 1934 associate professor, and finally in 1938 he became a full professor.

During World War II, he was taken prisoner by the Italian occupational forces in Kotor and was sent to a concentration camp. He was an inmate in several camps in Italy. Following Italian capitulation, he was transferred to Germany where he spent over two years in various concentration camps.

After Germany signed capitulation, he was liberated by the Soviet Red Army after which he returned to Belgrade and resumed his duties as a university professor. He served as Rector for five terms and during that time he devoted considerable attention to the reconstruction of the University's premises and facilities. Some of those, including laboratories, were in need of urgent repair. He set up various committees within University in order to facilitate and improve the quality of teaching and experimental work there. Using the war indemnity money, the committees managed to secure scientific literature and necessary equipment for many faculties.

Stevan Jakovljević efforts to improve the working conditions of University employees are highly commendable. The idea to build the students' campus in New Belgrade was instigated by him. He tried very hard also to secure necessary textbooks and literature for students at the University and in secondary schools. The books he wrote were in use for over ten years.

As well as trying to deal with the issues of botany, he produced 14 written works, some of them pertaining to morphological anatomy. At a later stage he also wrote on hydrobiology.

He can justifiable be praised for being the initiator of the study of hydrobiology. His university textbook *Ecology with Basics of Hydrobiology* was the first book of this kind in our country.

Jakovljević was also well known for his literary works. After publishing the novel *Serbian Trilogy*, he was elected a corresponding member of the Serbian Royal Academy in 1913, on the initiative of Branislav Nušić, Bogdan Popović, Uroš Predić and Djordje Jovanović – Serbia's four most prominent men of letter and culture at the time.

During his literary career that spanned 20 years, he published many novels and collections of short stories that were regarded as literary masterpieces, and so in 1959 Stevan Jakovljević was elected a full member of the Serbian Academy of Sciences and Arts.

Jakovljević was a university professor and Rector who was also actively involved in the social life of his community. In 1945 he was elect-

ed into the Provisional National Assembly. He also was a Peoples' Council deputy for two terms, a member of the Presidium of the Peoples' Assembly, secretary of the Literature and Language Department of the Serbian Academy of Sciences and Arts, president of the Yugoslav Association of Writers, etc.

Stevan Jakovljević received public acclaim and honor for his achievements: *the 7th July Award*, *the Medal of Labour of the First Class,* as well as many military decorations. In 1947 he was granted an honorary Ph. D., from the University of Praha.

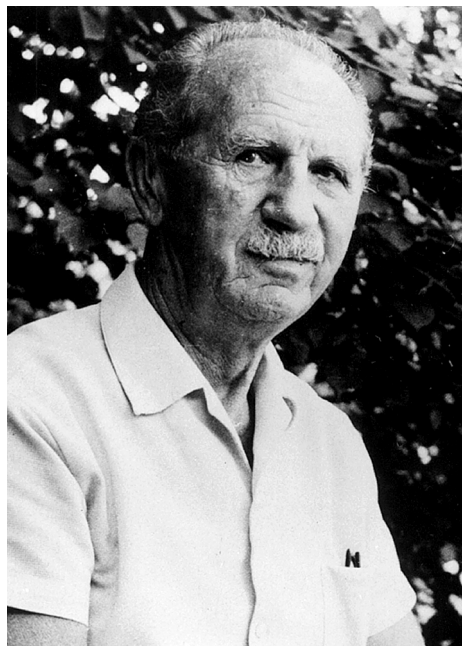
Stevan Jakovljević devoted his career to promoting and popularising science and to that end he wrote many articles, appeared in radio programmes, and gave public lectures. He paid a lot of attention to educating new generations of scientists and many M. A. and Ph. D. dissertations were defended under his guidance.

Thanks to his efforts, the Department of Pharmaceutical Studies of Medical School in Belgrade became the School of Pharmacy in 1945. It was autonomous within University but continued to share the premises with Medical School.

His wish for the School of Pharmacy to have its own building was not fulfilled during his life time due to unfavourable political situation and financial circumstances. Nevertheless, thanks to Jakovljević's persistent pleas for the construction of new college facilities, the authorities procured funds and a beautiful new school building in Torlak, a Belgrade suburb, was opened in the 1990/91 academic year.

Stevan Jakovljević died in Belgrade, on November 2, 1962.

Authors: *Tatić, Budislav; Janković, Milorad*



Mladen JOSIFOVIĆ
(1897–1981)

Mladen Josifović, the first Serbian phytopathologist and a giant in the field of biotechnnological sciences, was born in 1897, in the village of Suvi Do, the municipality of Žagubica, Smederevo County. He finished elementary education in the nearby village of Izvadica proving to be a talented pupil from the start. He continued his education at the Theological School in Belgrade. In 1914, however, by order of the Ministry of Education his education was discontinued and he was appointed to the post of a teacher in his native village.

Next year, still a pupil, Josifović was drafted into the army. Having survived the arduous golgotha through Albania, in 1916 he was trans-

ported, with other survivors, from Thessaloniki to France. First he reached Marseille and then went to Lyon where he completed his education and the military service. His 1917 graduation paper entitled *Unaware of what we have whilst it is there, we realize the loss once deprived of what we had* was highly praised by his school principle.

The same year Josifović enrolled at the University of Toulouse to study agriculture and botany with the main desire to help reconstruction of his country and development of agriculture.

Thanks to the well-known French phytopathologist of that time Prunet, he completed his specialist studies and defend his doctoral thesis, thus obtaining a Ph. D. in botany.

On his return to Belgrade, Josifović commenced his teaching career at the Fourth Belgrade Grammar School for Boys where he taught biological group of subjects. Immediately after the establishment of the Faculty of Agriculture and Forestry, he was elected assistant professor for the subject of phytopathology. It was the beginning of his 44-year-long and fruitful career as a university professor. He promoted this scientific discipline which became one of the most important subjects future generations of agriculture and forestry engineers studied. Mladen Josifović was an outstanding scientist, lecturer and pedagogue.

Motivated by widely spread forest diseases, in 1932 Josifović wrote his first textbook *Plant Pathology* for students of forestry.

He was elected assistant professor in 1933.

Josifović was at the peak of his scientific, pedagogical and professional activities when World War II broke out and he was expelled from the Faculty. After the liberation of Belgrade in 1944, he took active part in reconstruction of the Faculty and resumed his interrupted scientific and pedagogical activities. Inexhaustibly energetic, he worked on the renewal of expert agricultural services in Serbia.

Josifović was elected full professor in 1947. By 1956 he served several terms as Faculty Vice-dean and Dean. Between 1956 and 1964 he was Director of the Institute for Plant Protection of the Faculty of Agriculture.

Josifović's first textbook *Agricultural Phytopathology* for students of agriculture was published in 1948 and had two reprints, in 1956 and 1964. Parts of it have not yet been surpassed. His book *Forest Pathology*, published in 1951, is still topical.

His research of mycosis started with his doctoral dissertation, defended in Toulouse, in 1923. His greatest scientific achievements and the largest number of published works (39) are in connection with the subject of mycosis. His research included other topic - bacteria and viruses. His works were quoted in many scientific papers, monographs and textbooks in Yugoslavia and abroad.

Josifović was elected corresponding member of the Serbian Academy of Sciences and Arts in 1948, and full member in 1961; corresponding member of the Yugoslav Academy of Sciences and Arts in 1977.

Josifović was a very devoted teacher to his students, many of whom became experts in the field of plant pathology. Lectures, specialist courses and professionalism served as foundations for his school which continued to develop also after World War II. Phytopathologists from all over Yugoslavia received a lot of support from this outstanding scientist. Under his supervision 30 doctoral dissertations were defended and he was also a member of 40 Ph.D. committees.

He was a very active member of the Serbian Academy of Sciences and Arts. He chaired its Board for the Study of Serbia's Flora and Fauna until he died and had 10 volumes of *Flora of the SR of Serbia* published during that time. These publications represent his greatest contribution to the development of botany and biology.

Josifović was a very prolific publisher and assisted the making of encyclopedic journals: *Knowledge, Little Encyclopedia of Prosveta, Encyclopedia of Forestry, Agricultural Encyclopedia, and Encyclopedia of Yugoslavia.*

He was on the editorial board and also Editor-in-Chief of the periodicals *Farmer*, *Agronomers Association Gazettee, Proceedings* of the Faculty of Agriculture in Zemun, *Agricultural Sciences Archives*. With great enthusiasm he supported the creation and launching of the magazine *Plant Protection*.

Mladen Josifović was the founder of many associations and societies in the field of agriculture and biology, among which are the Yugoslav Agronomists Association, Serbian Agronomists Association, Serbian Agricultural Society, Serbian Society for Plant Protection, Serbian Biological Society, and also some international organizations.

For his scientific activities, spanning over six decades, Mladen Josifović received many awards, honors, medals, and plaques. He died in 1981 and was buried in the Lane of the Great of Belgrade's New Cemetery.

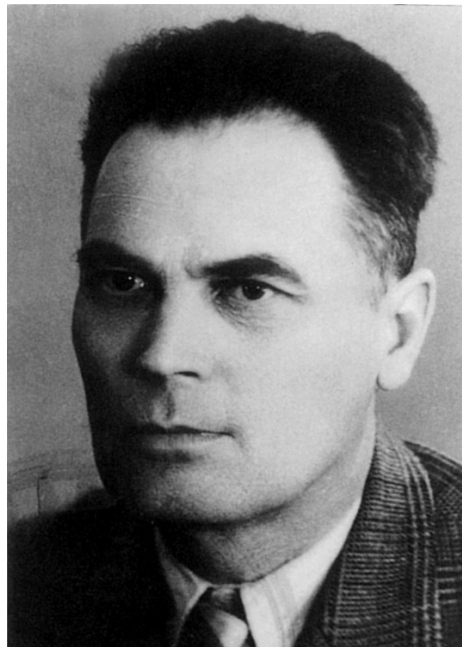
Author: *Babović, Milorad B.*

Milan JOVANOVIĆ BATUT (1847–1940)

Among Serbia's physicians from the period when the country was fighting for independence (1878-1918) and trying to promote and improve health culture and education, the name that stands out is that of Dr Milan Jovanović Batut. He came from Vojvodina but spent most of his life in Serbia where he worked on preserving the tradition established by our first educators Zaharije Stefanović Orfelin and Dositej Obradović, and physicians Jovan Stejić, Karl Pacek, Konstantin Pejčić, Gavrilo Pekarović and Vladan Đordević. Special methods that he applied in his work left a profound mark on the health education in our country. First, he thoroughly studied everyday customs, habits, living conditions, and

health problems of the people he was to educate. He then wrote short notes with very clear instructions about healthy living for them, which made him our greatest health educator. Dr Batut was an active promoter of medical science. He was a co-founder of sanitation services and preventative medicine in Serbia. He was first to introduce the principles of eugenics and he also studied health ethnology. He also was the originator of socio-medical ideas. Besides Dr Vladan Djordević, most credits for organising health service in Serbia went to Dr Batut. His contribution to health legislation was considerable. He presented the first bacteriological analysis as the Serbian Society of Physicians and he was also the first one who has published anthropometric measurement performed on a large number of younger persons (4000). In 1880 he started and was the editor of the *Health* magazine, the first publication of this kind of the South Slavs which dealt with the issues of hygiene and health education. The periodical was published at the time when more developed countries could not boast of having such literature. Dr Milan Jovanović Batut was the writer of the first University Act, the founder of the Belgrade Medical School, its first Dean and professor of hygiene. He initiated the gathering, study and classification of folk medical terminology.

Author: *Jović, Pavle*



Petar S. JOVANOVIĆ (1893–1957)

Petar S. Jovanović, one of the most talented students of the giant of Serbian geography Jovan Cvijić, unfailingly followed in his teacher's footsteps left in the field of science, organization and other aspects of public life.

He accomplished enviable results scientifically researching geomorphology, anthropogeography and geographical methodology. His greatest contribution was in the field of geomorphology, particularly the theoretical study of *formation of longitudinal river profiles* and *influence of the Pleistocene climate oscillations on river erosion*. Some of those studies provoked polemics and critical analysis, but also self-criticism;

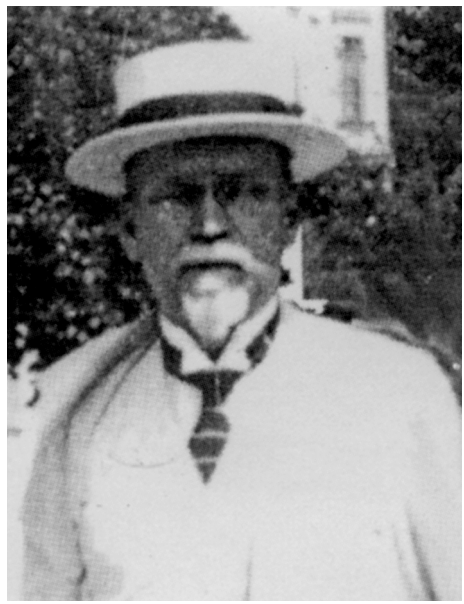
the usual and logical conduct of a good number of scientists who addressed the issues.

Petar S. Jovanović coped remarkable well also with organizational and personnel issues while working as a professor at the Faculty of Philosophy in Skopje (1922-1941), and during his Belgrade period (1945-1957) when he founded the Geographical Institute within the Serbian Academy of Sciences and Arts in 1947, and served as its life-time director. Due to his organizational skills, he was also the Academy's general secretary for 9 years (3 mandates).

Thanks to P. S. Jovanović, favorable conditions were created at the Geographical Institute, which bears the name of *Jovan Cvijić*, for gathering solid scientific personnel whose primary task was, and still is, the study of Serbia's national territories.

With sound foundations, based on the principles of original science, Geographical Institute *Jovan Cvijić* of the Serbian Academy successfully continues its creative activities. For more than 50 years, it has been standing as a monument to its founder Petar S. Jovanović and his enduring memory.

Author: *Zeremski, Miloš*



Milorad JOVIČIĆ
(1868–1937)

Dr. Milorad Jovičić graduated from the Belgrade Faculty of Philosophy and studied chemistry whith well-known scientists in Zurich, Berlin, Leipzig and Paris (1890–1896).

He taught chemistry at High School (1897–1899), the University (1906-1908) and the Military Academy. From 1907 until he retired, he worked as a chemist in the Mining Department of the Ministry of Economy. After retiring, he conducted research work in the laboratory of the Nobel Prize winner, Prof. Pregl, in Graz.

He published about one hundred scientific papers from different fields of chemistry: organic, inorganic, analytical, physical chemistry and electrochemistry. His best achievements were in the area of organic chemistry and are still quoted in this time and age. As far as analytical che-

mistry is concerned, he devoted himself to the study of mineral ores, mainly chrome from the mount of Kopaonik where he discovered a new mineral named *chromitite*.

He published his first work on the subject of electrosynthesis together with Sima Lozanić, but continued research work on his own. His early works, especially those done with Sima Lozanić, were often quoted. Later on he set out to prove his thesis about the transformation of elements in electrosynthetic reactions. This wrong hypothesis, to which he adhered to until he died, greatly diminished the value of his other works and was partly responsible for his name being eradicated from our scientific records.

Milorad Jovičić was a corresponding member of the Serbian Royal Academy, a member of the Yugoslav Academy of Sciences and Arts, and a member of the Italian Academy in Palermo which awarded him a gold medal for his contribution to science (1908). His biography and bibliography were included in the 1904 and 1924 editions of *Pogendorff's Encyclopaedia*.

Author: *Bojović, Snežana*

Jovan KARAMATA
(1902–1967)

The old and distinguished Czinczar Karamata family comes from the area of Mavrovo. At the end of 18th century they moved to Zemun and before long settled in the new community and started mixing with the Serbs. Jovan Karamata was born in Zagreb, on February 1, 1902 into a middle class family which was financially well established and spiritually rich. While still a baby, his family moved to Zemun which he always thought of as his native town. He started his elementary education in Budapest, in 1909 but continued and finished it in Zemun, in 1913. The same year he enrolled at Zemun Grammar School. In 1914, just before the outbreak of World War I, he left Zemun and moved to

Susak, near Rijeka. Because of the war his father sent him to Lausanne, Switzerland, where he enrolled at a cantonal grammar school and graduated from it in 1920. There he acquired good knowledge of mathematics at the secondary school level, but also developed appreciation of precision, pedantry and diligence, the qualities which left very vivid traces on his work.

He returned to Belgrade in 1920, and enrolled at the Technical Faculty of Belgrade University. He passed his entrance examination at the Civil Engineering Department of the Technical Faculty in 1922, but went to study mathematics at the Faculty of Philosophy, University of Belgrade, attending lectures on the theory of mathematics, applied mathematics and experimental physics there. He graduated in 1925 and before long was appointed assistant-trainee to Prof. Mihajlo Petrović. In 1926 he defended his doctoral thesis entitled *On a Type of Limits Resembling Definite Integrals.*

He was awarded a Rockefeller Foundation scholarship for specialist studies in Paris, which he undertook between December 1927 and September 1928. In 1929, after completing his Paris studies, he was appointed to the post of an assistant of mathematics at the Faculty of Philosophy of Belgrade University.

In 1930 he was elected assistant professor of mathematics, in 1937 associate professor, and in 1950 full professor. In 1951 he left Belgrade for Geneva, to work as a University professor there. He died in Geneva, on August 14, 1967.

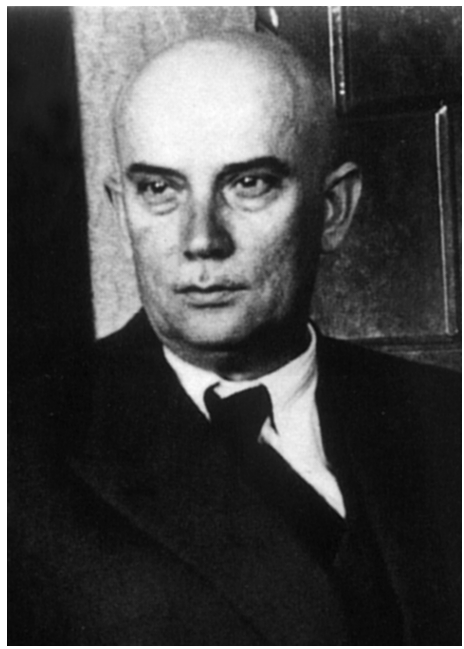
Jovan Karamata published 122 scientific papers, 10 monographs and textbooks and pedagogical essays. His most relevant achievements were in the area of classical mathematical analysis or, more precisely, the Tauberian theory of functions, and the theory of slowly varying and regularly varying functions.

The results, together with those obtained in other fields of analysis and mathematics (Merser theorem, inequalities, trigonometric integrals, etc.), were often quoted in works and monographs of his contemporaries, and are being quoted even today. He was a highly respected scientist and lecturer. He participated in a number of congresses, and visited universities in Europe and America. His scientific reputation earned him a membership to the Yugoslav Academy of Sciences and Arts in 1933, the Czech Royal Society in 1936, the Serbian Royal Academy in 1939, and full membership to the Serbian Academy of Sciences, in 1948. He was a member of Swiss, French and German mathematical societies, a member of the French Society for Development of Science and was also a permanent associate of the scientific journal *L'Enseignement Mathematique.* He actively partici-

pated in University's activities, and the working of the Serbian Academy of Sciences and its Institute of Mathematics. He greatly increased the reputation of the Belgrade mathematical school in the world.

Original mathematical solutions won Jovan Karamata world fame. Equally renowned was his school of mathematics. Some of his students also became distinguished mathematicians.

Author: *Nikolić, Aleksandar*



Radivoj KAŠANIN
(1892–1989)

Radivoj Kašanin was born in Beli Manastir, Baranja, on May 21 according to the Julian calendar. He attended the Serbian elementary school in his native town from 1892 to 1902. He completed first three years of grammar school education in Osijek after which he moved to Novi Sad, finishing the fourth year and passing the final exams there. In 1910 he began his studies of mathematics and astronomy in Vienna, and in 1911 he moved to Zagreb University where he stayed until the summer of 1913. The same year Radivoj Kašanin moved to Budapest University, to continue his studies of mathematics. The beginning of World War I in 1914 interrupted his studies in Budapest; he was mobilized by the Austro-

Hungarian Army. In May 1915 he was sent to the Russian front. He was demobilized soon and in 1920 he went to Paris where he completed his studies of mathematics at the Sorbonne in 1921 (Licence es Sciences mathematiques). He defended his doctoral dissertation in 1924. He was appointed assistant at the Technical Faculty of Belgrade University in 1922, an assistant professor in 1926, associate professor in 1930, and full professor in 1939. He was elected Rector of the Technical College for two terms of office (1950/51 and 1951/52).

He was elected corresponding member of the Serbian Academy of Sciences on March 2, 1946 and full member on June 10, 1955. He held the post of director of the Institute of Mathematics from 1951 to 1958, was president of its Council from 1958 to 1961. In 1950 the *Proceedings* of the Institute of Mathematics was published and for the next ten years Radivoj Kašanin was its Editor-in-Chief. From October 1, 1957 to January 12, 1959 Radivoj Kašanin was deputy Vice-President of the Serbian Academy of Sciences.

During his studies in Vienna, Zagreb, Budapest and Paris he received excellent training and acquired a fair amount of knowledge of mathematics, rational mechanics and astronomy. From the very beginning of his appointment at Belgrade University, his intellectual and scientific erudition served to guide his younger colleagues and students, encouraging them to venture into the world of science.

Successful achievements of Radivoj Kašanin are evident in many fields: the theory of differential equations, theory of complex functions, analysis, geometry, interpolation and approximation, mechanics, astronomy and geophysics and in each of the mentioned fields of his work he published papers that were acknowledged.

As a Belgrade University professor and the head of the mathematical departments of its technical faculties, Prof. Kašanin played an important role, his books about higher mathematics in particular, in upgrading the level of teaching of mathematics. For a while he held office as Rector of Technical College.

He was director of the Mathematical Institute for many years, then president of its Scientific Council which considerably improved its reputation. Young mathematicians and many other researchers enjoyed his full support.

Radivoj Kašanin is rightly regarded as a talented mathematician and a scholar of broad scientific culture. Thanks to his profound and

diverse knowledge of many areas of mathematics, mechanics and astronomy he is thought of as our last encyclopedist.

Radivoj Kašanin was a friendly and witty man, blessed with a remarkable memory and a gift for observation. He died in Belgrade on October 30, 1989 and was buried there.

Author: *Simeunović, Radivoje*

Ljubomir KLERIĆ (1844–1910)

Mining engineer, professor, academician, Minister Ljubomir Klerić (Julius Klery) is a figure who for many years has honorably held high the torch of Serbian science and education, a figure fondly remembered by his older students but feared by the younger ones. This is because the latter seemed to have an unprofessional approach to work – this is the time to proclaim freedom and constitutional government in Serbia – and in mechanics exams almost all of them fared badly. There is nothing that Ljubomir Klerić despised more than sloppiness. He loved his new homeland more fervently than many of its own sons.

He was a worthy follower of Daničić, Pančić and Nešić and a real intellectual and scientific enthusiast. He provided guidance to his

younger colleagues and students, and encouraged them in their search of truth. His enthusiasm for science was a powerful expression of many of his talents and something he never lost even when, caught in the unsettled social and political situation, he entered political and administrative services. He was a minister of education and also of national economy, a State Council member, and a victim of a society torn asunder by political fever.

A mining engineer and geologist by profession, with a distinct talent for mathematics, Klerić was more inclined to the applied than theoretical science. This alone can explain the discrepancy between his talent and the impact of his scientific work. Additionally, and bearing in mind the time in which he lived and the environment in which he created, Klerić was undoubtedly a pillar of Serbian society and a major influence on Serbian scholars. His work gave a new lease of life to Serbian people, which they used to leave their patriarchal world and join the family of civilized nations.

This is what Academician Dr. Bogdan Gavrilović, his contemporary, wrote about Ljubomir Klerić.

Documents taken from the 1887 *Annual of the Serbian Royal Academy* disclose biographical facts about Ljubomir Klerić. Julius Klery (later known as Ljubomir Klerić) was born in Subotica, Austria-Hungary, on June 29, 1844. In his 1888 curriculum vitae, Klerić gives the following information about his schooling. After completing elementary education in Subotica, he moved to Belgrade in 1855, and there went to secondary school for eight years. After graduating from it in 1862, he studied engineering for two years at the Belgrade College. In 1865, having received a state scholarship, he went to study mining engineering at Mining Academies in Freiberg and Berlin. He also studied mechanical engineering at the Zurich Polytechnic.

Following the completion of his studies, in the summer of 1870, Klerić did some practical work in German mines in Westphalia, Saxony, and Upper Silesia, and in Pribram mine in Bohemia, after which he returned home and joined the civil service at the Mining Department of the Ministry of Finance.

Klerić constructed and patented a new drill for deep soundings. Using the money he received for his invention, put to practice in salt mines at Stanfurt in 1871, and in the coal mines of Hirst and Dinstaneken in Westphalia, he could support himself while living abroad. Working in Westphalia for a Dutch company, he excelled so much that the company appointed him research engineer who was to study the mineral wealth of Serbia and Oran.

Klerić returned to Belgrade in June 1875, did geological exploration for a while, and the same year he became a professor at the Mechanical Engineering Department of the Belgrade College.

Klerić also wrote three volumes of textbook and equipped the mechanics laboratory at the College. He kept abreast of scientific developments in the world, maintained contact with scientists from the universities where he studied, published works in German scientific journals and, in 1871, became a member of the Serbian Learned Society. In 1876 he went to Serbo-Turkish War, earning a medal for bravery.

He became a full member of the Serbian Royal Academy in 1887, together with Dr. Josif Pančić, Dimitrije Nešić and Jovan Žujović. His introductory treatise was on the theory of compensation.

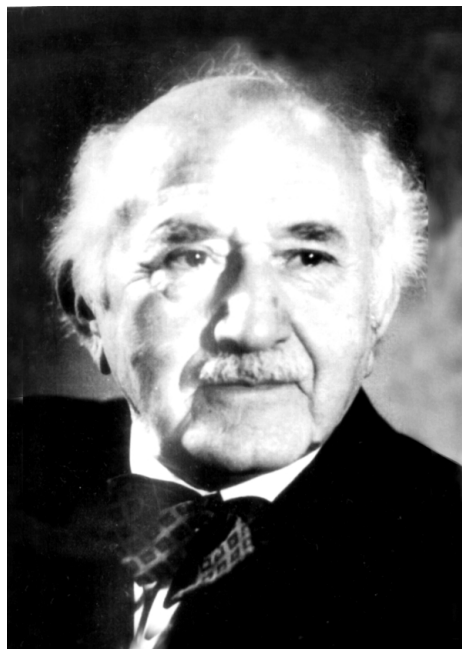
At Academy meetings, Academician Klerić exhibited some of his inventions, like the polypantograph - a new typewriter; the tractoriograph or logarithmograph - a new type of compass, and the curvometer and logarithmometre - a measuring instrument; delivered lectures on his tractoriograph and its application, and a treatise on kinematic determination of elliptical integrals.

He served as Minister of Education and Ecclesiastical Affairs for a few months, between the autumn of 1894 and June 1895. During his term of office issued were several legal acts which brought order and discipline into the system of education, compelled ecclesiastical courts to maintain proper documentation, introduced standards for writing of textbooks, helped students reach universities abroad, etc. While serving as Minister of National Economy, between December 1896 and October 1897, Klerić introduced legal measures designed to stimulate industrialization, agriculture, quality control and general level of technical knowledge of the people of Serbia. He also addressed issues of technical education and protection of health of people, animals, and plants of Serbia.

Ljubomir Klerić was awarded *the Order of Leopold* by the Belgian monarch.

He died in Belgrade, on January 21, 1910.

Author: *Stevanović-Hedrih, Katica*



Aleksandar Dj. KOSTIĆ
(1893–1983)

Aleksandar Kostić was the founder of the Institute of Histology and Embryology at the Medical School, University of Belgrade. He was a pioneer of these scientific disciplines, and deserves credit for developing and promoting medical photography, medical terminology, sexology and sexual education. He was a man of high intellectual curiosity and tremendous creativity; a passionate composer, pianist, poet, photographer and archeologist. He won recognition and rewards in his life-time, but also experienced a lot of disappointments and injustice.

Aleksandar Kostić was born in Belgrade, on March 6, 1893 into a bourgeois family. Already at high school, he showed multiple talents. As well as excelling in natural sciences, he was successful in composing,

writing and photography. In 1912, after finishing high school in Belgrade, he went to Nancy (France) to study medicine. The Balkan Wars in 1913 interrupted his studies and he volunteered to work as a medical assistant at the military hospital in Belgrade. After the war, he went back to France and continued medical studies in Montpellier. In 1914, because of World War I, he returned to Belgrade and once more joined the military medical corps as a volunteer. During the war Kostić experienced all the hardship that Serbian army was exposed to while retreating through Albania, Corfu, and the Thessaloniki Front before its victorious return to Serbia. He received several medals for bravery and his efforts to improve the health of the soldiers. Following his discharge from the army, he received state fellowship and went back to France to resume his medical studies. There he met Smilja Joksić and they were married in 1919, in Montpellier. His wife, a future professor of pediatrics at the Medical School in Belgrade, also finished medical studies in France (Strasbourg). They had two sons, Vanja and Vojislav.

Aleksandar Kostić completed his medical training in Strasbourg, where he also defended his doctoral thesis in 1921. Following the invitation of the Dean of the newly founded Medical School in Belgrade, Prof., Vojislav Subbotić, he returned to Belgrade in January 1922, and become the first professor of histology and embryology. Prof. Kostić invested much of his energy in the setting up of the Institute of Histology, new and modern at the time, and the development of the Medical School. He was Dean for three terms, between 1936 and 1939. During his term of office, Kostić significantly improved teaching of histology and embryology by, among other things, writing several textbooks and conducting scientific research. His research was mostly related to experimental studies of the alcohol induced histological alteration of testicular tissue, by which he showed detailed degenerative changes of both germinal and supporting cell types. He also studied the effects of other toxic substances on gonads. Additionally, he conducted different experimental studies in order to explain the function of the spleen that was largely unknown at that time. He also studied the structure and functions of other organs and systems, and endeavoured to promote various research techniques, such as tissue culturing.

Prof. Kostić was the founder of the Photographic Department within the Institute of Histology. This Department provided services for many researchers in various academic institutions of Belgrade University. The first microphotographic pictures were made there and, in the period after World War II, Kostić started the production of first educational movies, including those of different surgical procedures.

Much of his life and work he devoted to studying medical termi-

nology. He organized so-called *terminological seminar*, gave lectures, wrote papers on different topics concerning medical terms, and had several reprints of a large multilingual medical dictionary.

Along with his academic career and teaching activities, Prof. Kostić was very much engaged in educating people about their health. He gave more than a thousand lectures for the masses throughout the country, majority of which addressed sexual issues and presented the topic of many books he had published. He was also the editor of popular scientific periodicals and medical books.

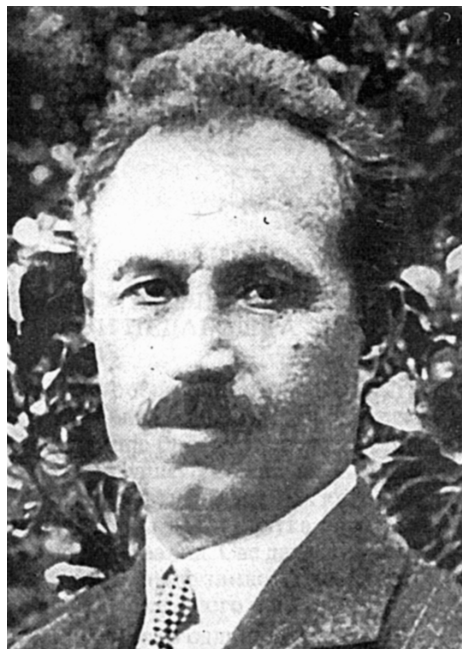
He never neglected music and writing. In 1949, in Paris, he won a prize for the best poem written in French by a non-native speaker.

A brave and honest man who always adhered to his moral principles, Prof. Kostić was expelled form the Medical School on two occasions; first in 1942 because of his opposition to German occupational forces, and then in 1952, because of his attitude about the communist regime. Kostić could not relinquish his moral principles and he unsuccessfully wrote many letters to the authorities about the injustice he was exposed to, demanding the annulment of the decision for his expulsion. Although disappointed in people, he continued to find comfort in work. Being out of his laboratory, he resumed writing books and working on medical terminology. Kostić also developed passion for archeology, and as an amateur archeologist dug out and discovered over 500 archeological and Paleontological sites, donating the finds to the Grocka Community Museum.

Prof. Aleksandar Kostić received numerous honours and decorations during his life-time, *the French Legion of Honour Medal* awarded to him in 1940 being just one of many.

He died in Belgrade on January 19, 1983. As a tribute to him for his outstanding accomplishments and contributions to the Medical School, the Institute of Histology and Embryology was named after him. Ten years later, while commemorating Prof. Kostić's 100th birthday anniversary, the Medical School organized a symposium as a mark of respect for this remarkable man and his work achievements. Finally, on January 24, 2001 the University Council of Medical School annulled all the decisions regarding the ousting of their professors and overturned the expulsion verdicts for Prof. Kostić and his wife.

Author: *Bumbaširević, Vladimir*



Nedeljko KOŠANIN (1874–1934)

Born to a farmer's family, in the village of Čečini, near Čačak, on October 13, 1874 Nedeljko Košanin successfully completed his primary and secondary education and enrolled at Belgrade College – Department of Natural Sciences and Chemistry. Studying under a restricted regime, Nedeljko Košanin completed his studies with outstanding results. He acquired his Ph. D. in botany from the University of Leipzig in 1905; having written a paper on plant physiology.

Upon returning to Belgrade, he worked as a grammar school teacher for a while, after which he accepted different posts at Belgrade University. He was appointed part-time senior lecturer before becoming a full-time pro-

fessor. As the Head of the Botanical Institute and the Botanical Garden of Belgrade University, Nedeljko Košanin started the periodical *The Botanical Institute* and *The Botanical Garden Herald*, apparently still being published today. He was Dean of the Faculty of Philosophy (1927–1928), and a corresponding member of the Royal Academy of Serbia (1914–1922). He became a full member of the Academy in 1922, and kept the position until the year he died, 1934. He was a fellow member of the Botanical Societies of Prague, Berlin, Paris and Warsaw.

Nedeljko Košanin was a biologist, but primarily a versatile botanist. His best known results were achieved in the fields of flora taxonomy, systematics and phytogeography. Nedeljko Košanin's scientific opus included publications, surveys and reviews in the fields of enthnomology, algology, climatology, phitocenology and ecology, accumulated over a 30-year-long period of constant research. He published 58 scientific surveys altogether, some in Germany, a number of which are considered pione-ering attempts at discovering Serbia and Yugoslavia. Nedeljko Košanin gave a detailed description of 11 completely unknown plant species; 8 have been recognized as the basic regional flora of Europe and the Balkan Peninsula. His discoveries have undoubtedly enriched our knowledge and understanding of the local flora, as well as Balkan flora in general, enabling us to perceive floristic bonds and links, and the close relationship of Balkan flora with the flora of Upper Asia and the Mediterranean. Nedeljko Košanin undeniably deserves praise for his discoveries in the field of geobotany; he made a clear distinction between the basic floral and plant characteristics, and their specific features, characteristic of Macedonia, Albania, Montenegro and Serbia. Even though more than 30 years have passed since his death, results of his research are still being quoted in the Science Citation Index. As a token of appreciation of his achievements, ten new plant species have been named after him.

Not only was he an exceptional scientist, but also a gifted teacher who never failed to appear at his lectures, and never took temporary leave of absence from University. As well as holding consultation classes, he accompanied his students on their excursions.

He wrote a botany textbook for secondary school pupils and *The Physiology of Plants* for University students. Nedeljko Košanin's political affiliations were with the socialists from the very beginning. For over 30 years, he fought for workers' and people's rights. His work and activities greatly enhanced the development of the workers' movement, acknowledged in our country and abroad. His standpoint was very clear –

democracy in socialism – and when *The Opposition's Manifest of the Communist Party of Yugoslavia* was written, Nedeljko Košanin signed the document. It was never discovered whether his political activities and viewpoints had any bearing on his teaching.

Nedeljko Košanin died in Belgrade, in 1934.

Author: *Sarić, Miloje, R.*

Djuro KUREPA
(1907–1993)

Djuro Kurepe, born on August 16, 1907 in Majske Poljane, Srpska Krajina, was the fourteenth child in his family. He finished elementary and secondary school in Majske Poljane, Glina and Križevci. He obtained his diploma in theoretical mathematics and physics from the Faculty of Philosophy of Zagreb University, in 1931. Kurepa spent the years 1932–1935 in Paris, at the Faculte des Sciences and College de France. He acquired his Ph.D. from the Sorbonne in 1935, under the supervision of Maurice Frechet. He did his post-doctoral studies at some of the world's best institutions: Warsaw University and Paris University of (1937). After World War II, he went to Cambridge (Massachusetts), the

mathematics departments of the Universities of Chicago, Berkeley and Los Angeles, and the Institute of Advanced Studies at Princeton.

Kurepa started his professional career at Zagreb University in 1931, as mathematics assistant. He became an assistant professor at the same institution in 1937, associate professor in 1938, and full professor in 1948. He stayed in Zagreb until 1965, when he moved to Belgrade where he was offered the post of a full professor at the Faculty of Science of Belgrade University. He remained there until his retirement in 1977. Meanwhile, he was a visiting professor at Columbia University in New York (Summer School 1959), and Boulder, Colorado, in 1960. Besides teaching, Kurepa also successfully organized scientific activities and dealt with administrative matters. He was the founder and president of the Society of Mathematicians and Physicists of Croatia, president of the Union of Yugoslav Societies of Mathematicians, Physicists and Astronomers, president of the Yugoslav National Committee of Mathematics, and president of the Balkan Mathematical Society. Furthermore, he was the founder, and for many years the Editor-in-Chief, of the scientific journal *Mathematica Balkanica,* now published in Sofia. Kurepa was also on the editorial board of Belgrade's *Publications del'Institut Mathematique,* and the German periodical *Zeitschrift fur mathematische Logik und Grundlagen der Mathematik.*

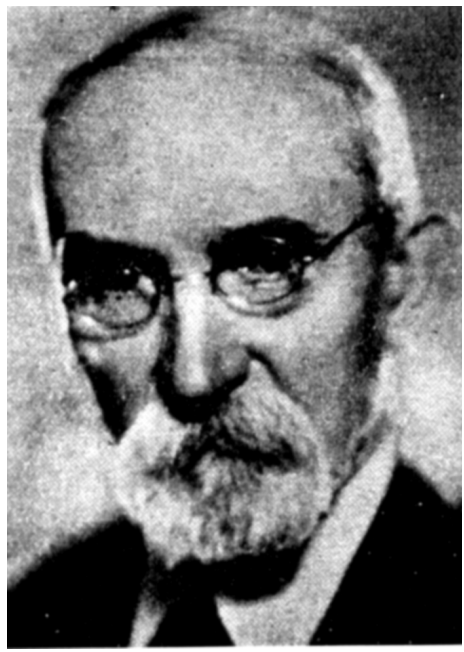
Prof. Kurepa received many awards, honours and distinctions. He was the recipient of the highest state honour of former Yugoslavia – *the AVNOJ Award* (1976). He was a full member of the Serbian Academy of Sciences and Arts (SANU), the Academy of Science of Bosnia and Herzegovina, and a corresponding member of the Yugoslav Academy of Sciences and Arts (JAZU) in Zagreb. He, also, was a member of the Tesla Memorial Society of the U.S.A. and Canada (1982), and received *the Bernhard Bolzano Charter*, and *the Marin Drinov Charter* of the Bulgarian Academy of Science (Sofia 1987).

Scientific opus of Prof. Kurepa is fascinating. He published over 200 scientific reports and more than 700 various pieces of writings: books, articles, reviews. His papers appeared in journals all around the world and some were published by the most distinguished mathematical periodicals. Many of his texts were translated into English, French, Italian, and some other languages. He gave lectures at universities across Europe, America and Asia. He participated at dozens of international symposia, many of which were organized by him. Prof. Kurepa had contacts with numerous mathematicians from around the world and thanks to him many of them visited Belgrade. He was especially proud of his encounter with Nikola Tesla, and was very fascinated by the great Serbian scientist and engineer.

The influence of Prof. Kurepa on the development of mathematics in Yugoslavia was immense. At Zagreb University he introduced several mathematical disciplines, mainly in relation to the foundations of mathematics and set theory. Sibe Mardešić, a professor at that University, best described him: *He had a great influence on our University, particularly by introducing modern aspects into mathematics, and his work was also of great benefit to our community.* With his doctoral dissertation *in extenso,* published in Belgrade's *Publications del'Institut Mathematique* in 1935, Kurepa entered the Belgrade mathematical circle. These contacts became more frequent in the 1950s. His arrival to Belgrade in the mid-sixties, and the subsequent influence on its mathematical circle, may be described in similar words. Prof. Kurepa used seminars, courses and talks to reveal the latest results obtained in various mathematical disciplines. In lectures, among other topics, he addressed the following ones: the construction of Cohen forcing, questions concerning independence results in cardinal and ordinal arithmetic, ordered sets and general topology. He also taught mathematical analysis, algebra, number theory, and even computer science. His lectures inspired many mathematicians and graduate students to write mathematical essays, and obtain master's and doctoral degrees. Many of these mathematicians continued and further developed Kurepa's work.

Kurepa was interested in many areas of mathematics, and he greatly improved them. His especial interests were set theory, general topology, foundations of mathematics, number theory and algebra and also included topics of partially ordered sets, particularly trees, the continuum hypothesis, the principle of mathematical induction, cardinal functions in topology, the general theory of uniform and metric spaces, fixed point theorems, the so-called left factorial function, and certain problems in matrix theory. Several important mathematical notions were named after him: Kurepa tree, Kurepa hypothesis, Kurepa line, Kurepa space, etc. Only the greatest scientists deserve such honour.

Author: *Mijajlović, Žarko*



Vladimir DIMITRIJEVIČ LASKAREV (1868–1954)

V. D. Laskarev was born on July 9, 1868 in Birjuč, County Voronesh in Southern Russia, now Ukraine, into a military family. He graduated from Chernjigov Grammar School, in 1887 and from Odessa University, where he studied natural sciences, in 1891. He attended Prof. Sincov's lectures on geology and decided to dedicate himself to science.

After leaving university, he spent a year working at the Mintag Institute at St. Petersburg. With a degree in geology, Laskarev was appointed assistant to Prof. Sincov at Odessa. Attending lectures given by assistant Prof. N. Andrusov, he showed special interest in the Neogene of Southern Russia. He attracted attention with his first works and soon

became an associate of the Geological Committee of Russia. His first assignment was to tackle 17 sheets of the General Geological Map of the European Russia. He spent 15 years working on it.

Between 1898 and 1900 Laskarev made two long study trips to Europe. He spent some time in Vienna, Budapest, Zagreb, Belgrade, Munich, Zurich and Geneva. On his travels he studied various geological collections, different terrains, attended lectures presented by famous professors, met many distinguished geologists, discussed problems of the Neogene of Southern Europe with them while seeking answers to his own questions. He understood well the importance of the Neogene of Belgrade surroundings and befriended Serbian geologists.

Upon his return to Russia, he was appointed assistant professor at Novorosian University in Odessa (1902). Under the mentoring of Prof. N. Andrusov, he defended his master's thesis on the subject of fossils in Buglovka formations, in 1903. In 1904 he was appointed to the post of a professor of geology and paleontology in Odessa. He kept the post till 1920. During that period, along with lecturing, Laskarev was very active in dealing with local geological problems of Southern Russia. Slowly but systematically he charted the 17-sheet geological map, studied loess and other Quaternary sediments of Ukraine, solved problems of Ukraine's crystalline massif, and excavated and studied Pykermian fauna from a series of deposits of Southern Russia. He used the materials, collected for the geological map of Russia, as the topic of his future doctoral dissertation which he defended in Kiev, in 1916.

After the October Revolution, Laskarev left Russia in 1920. He went to Constantinople for a while and then to the island of Prinkipio in Greece. At the invitation of his colleagues, he came to Belgrade, on May 5, 1920. He was appointed part-time professor at the Faculty of Philosophy, Belgrade University. He kept that post until 1950, when he obtained a Yugoslav citizenship after which, at the invitation of the Faculty of Natural Sciences and Mathematics, he was appointed full professor.

In 1932 he was elected corresponding member of the Serbian Academy of Sciences and Arts, and full member in 1947. After World War II, he was Head of the newly established Geological Institute of the Serbian Academy of Sciences and Arts (1947–1951).

After a few months of illness, he died on April 10, 1954 and was buried with full honours at Belgrade's New Cemetery. Laskarev published about seventy pieces of work; 25 in Russia and the rest in Yugoslavia. He tackled four groups of issues: 1. the Neogene in south-eastern Europe; 2. fossil mammals of Serbia and Yugoslavia; 3. tectonics of Yugoslav

Neogene and older terrain; 4. loess and other Quaternary formations of Belgrade surroundings and of Vojvodina. He achieved remarkable results in all areas of his research. Important were also results obtained in connection with systematization of north overturn nappe of Fruška Gora Mt but his discovery of Paratetis, a large peripheral sea which surfaced during the Neogene over a considerable part of southern and south-eastern Europe, won him world-wide public recognition and fame.

V. D. Laskarev was a very quite, modest and gentle man, as well as a famous geologists and paleontologist. His studies were of enormous benefit to Yugoslav and European geology thanks to which his name will go down in history of European and Yugoslav science. His infallible knowledge, and sincerity with which he treated his associates, earned him the respect and affection of his contemporaries and students.

Authors: *Grubić, Aleksandar; Pantić, Nikola*

Djordje LAZAREVIĆ (1903–1993)

Djordje Lazarević was born on March 16, 1903 in Vlasina, near Surdulica. Frequent Balkan wars and the events of World War I often interrupted his elementary and secondary schooling. He attended primary school in Ristovac and Surdulica, and grammar school in Niš and Pirot. He graduated from the Belgrade Technical Faculty, the Civil Engineering Department, in 1927. Following graduation he accepted employment with a prestigious construction firm *Matija Bleh-Architects*, Belgrade branch. He earned promotion very quickly. He became an independent constructor, engineering advisor to the Yugoslav Railways, permanent expert on the Sava quay building project and manager of *Silos AD* construction

bureau where he designed one of the most modern silos in Europe, built in Smederevo. A few years before World War II, he opened his own construction bureau.

During World War II, as a Yugoslav reserve officer, he was imprisoned in a concentration camp at Osnabrück, in Germany. There he set up and presided over a technical association of officers - engineers and technicians, gave lectures and organized a technical exhibition of new Yugoslavia as a scientific and propaganda demonstration. This was all done in compliance with the Geneva Convention.

After his return from captivity, in 1945, he actively participated in the reconstruction of the war-torn Yugoslavia, especially Serbia and Belgrade. He set up a design institute within the Serbian Ministry of Civil Engineering and was it first director. In 1947 he became a part-time professor for a group of engineering subjects at the Technical Faculty, Department of Architecture. In 1948 he moved to the Faculty of Civil Engineering in Belgrade and in 1950 became a full professor for the subject of concrete construction. He was elected a correspondent member of the Serbian Academy of Sciences and Arts in 1955 and its full member in 1958. He became an honorary doctor of Belgrade University in 1971 and a corresponding member of the Academy of Sciences and Arts of Bosnia and Herzegovina in 1973.

Djordje Lazarević was the first post-war president of the Society of Engineers and Technicians of Serbia, later known as the Society of Engineers and Technicians of Yugoslavia (1946). Between 1958 and 1964 he was the first president of the Yugoslav Society of Architectural Engineers. He also became their lifetime honorary president. He was the recipient of the *AVNOJ Award, the 7th July Award of the Republic of Serbia* for his lifetime achievements, *the city of Belgrade October Award*, and many more. He was also first to receive a lifetime achievements award in the field of constructional engineering. He was decorated with *the Medal for Labour of the 1st Order* and *the Medal of the Yugoslav Star with the Silver Wreath.*

Lazarević was forced into taking retirement in 1973 and he died in Belgrade on June 28, 1993 where he was also buried.

Djordje Lazarević was one of Yugoslavia's most prominent scientists and inventors in the field of concrete and pre-tension construction theory and practice. His works marked an epoch and he rightly deserves to be called a mastermind of Yugoslavia's 20th century structural design and construction.

His opus as an architectural engineer, spanning more than 65 years, is very rich and diverse. His projects, particularly the ones from the field

of engineering, have considerably enriched our as well as the world's civil engineering heritage. Over 180 printed scientific papers helped Yugoslavia's engineering theory and practice match that of technically developed countries. His published university textbooks on the subject of concrete construction (*Structural Design of Concrete, Design Capacity of Linear Systems* etc), study papers, monographs, as well as a number of original construction solutions, procedures and systems, some of which represent the world's best achievements in the field, further developed the area of engineering. He designed a number of extremely important projects, which in terms of aesthetics, functionality, cost-effectiveness, particularly the choice of optimal solutions, are valued very highly by our and the world's standards. With his ideas, inventions and project realizations he was often well ahead of his time.

Djordje Lazarević was one of Europe's first scientists who, as early as 1934, started examining creep occurrence in concrete constructions. He was among the first researchers in the world who, during 1939 and afterwards, was very successful at economic sizing of concrete constructions and is regarded today as a pioneer of modern optimization of such constructions. Djordje Lazarevic's idea of cantilevered construction of long span concrete bridges without support is widely recognized and highly respected in the scientific world. In 1939, an article about it appeared in *Beton und Eisen,* Europe's best known specialist magazine at the time. This idea heralded a significant move forward in the development of bridge building technology in the entire world. Lazarević also invented transmission-line pylons system (*Lazarević system*) which was crucially important during an intensified electrification of Serbia, Macedonia and Bulgaria after World War II. His study of the mountain massif characteristics makes Djordje Lazarević a pioneer in the field of rock mechanics. He was among the first people in the world who confirmed that anisotropy represents a general physical and structural feature of a rock mass. He designed radial press which is used to determine rock mass deformity *in situ,* and which for years has been a standard measure in designs of dams and hydro-technical tunnels under pressure, even in technically developed countries.

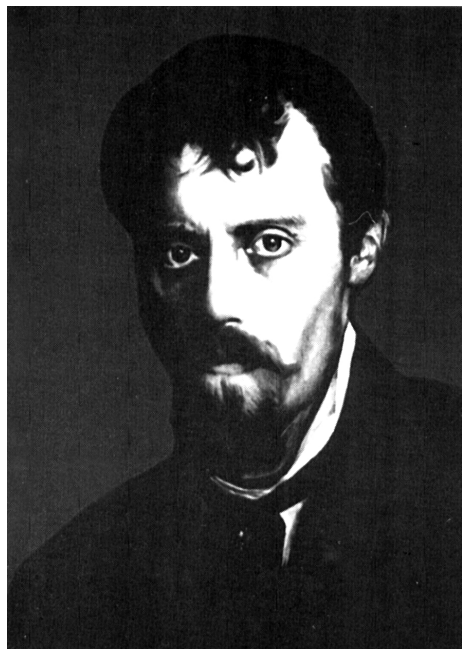
Some of Djordje Lazarević's projects are quite remarkable. His exceptional piece *Albania Building* was made of reinforced concrete (1939) and for a very long time stood as the tallest building in Central and South-Eastern Europe. *Hotel Majestic* in Belgrade, with its ultra light dome, is the only shell roof structure in the world capable of carrying moving load *–human rush*. The *Beograd Department Store* in Belgrade, known as the *TA–TA Department Store* in the past, was the first building

on the territory of Yugoslavia (after World War II) which had skeleton construction made of reinforced concrete. His bridges of exceptional beauty, originality and cost-effectiveness (together with bridges on the river Vardar in Skopje and a bridge on the river Nišava in Niš) are the pride of our bridge building industry.

Broadly educated, a teacher to many generations of civil engineers, scientist and an extraordinary expert, humanist and pedagogue with a special flair for working with junior assistants, Prof. Lazarević was instrumental in the creation of the so-called Belgrade engineering school. The institution, well known and highly respected in the world for a long time, also generated a multitude of renowned constructors, builders, scientists, professors, academicians, etc. Over 1100 students graduated under him. He mentored a large number of post-graduate students and some Ph.D. candidates, too.

The scope of Prof. Lazarević's scientific achievements is impressive. His early works, published before 1941, were written to fill in a gap created by a huge shortage of good quality literature in the field of engineering theory and practice, whereas his later works were better programmed and of more studious and comprehensive nature. In view of the fact that he used mostly concrete in his designs, and also taught related subjects, most of his works dealt with problems of such constructions. He paid a special attention to the analysis of stability, durability, cost-effectiveness, aesthetics, and other relevant engineering parameters. He very successfully conducted research work into the performance of special objects, such as silos, tall structures, chimneys, transmission-line pylons, long span bridges, arched constructions, concrete dams, pressurised hydro-technical tunnels, structure foundations resting on piles, reactor vessels, etc. Great was his contribution towards the building of objects of capital and representative quality, especially in Serbia (bridges on the rivers Sava and Danube, the *Avala Tower*, *Beogradjanka Building*, the building which once housed the Central Committee of the League of Communists of Yugoslavia, *25 May sport's recreational centre* and many more). Being a consultant, advisor and assessor, he produced original ideas which influenced and improved conceptual solutions and building technology of the mentioned objects.

Author: *Aćić, Mirko*



Laza K. LAZAREVIĆ (1851–1891)

Dr. Laza K. Lazarević (May 13, 1851 – January 10, 1891) was a renowned writer (also known as the Serbian Turgenev), a member of the Serbian Royal Academy and one of the 100 most prominent Serbs of his time.

He was also an outstanding physician, Serbia's first clinician and physician-scientist, pioneer and the founder of Serbian neurology and geriatrics.

He studied law in Belgrade and medicine in Berlin. He was the Head of the Medical Department of the General State Hospital in Belgrade, and a personal physician of Serbia's King Milan Obrenović.

During his short medical career, between 1877 and 1890, he wrote 77 papers.

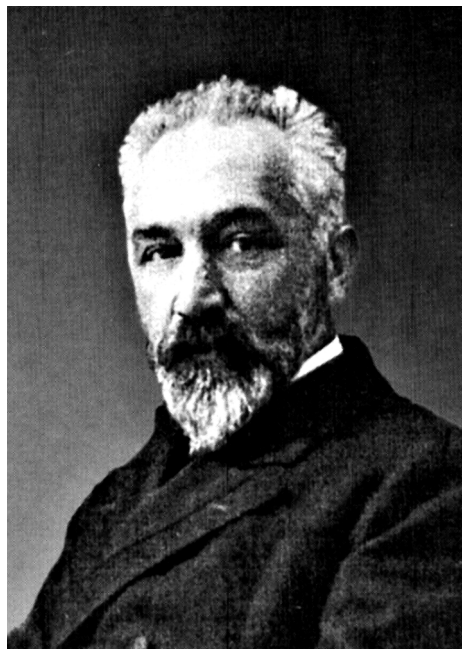
In his paper *Ischias Postica Cotunnii; A Contribution to its Differential Diagnosis,* which appeared in the 1880 Serbian General Medicine Archives (also translated into German and published in Vienna) he described the straight-leg-raising sign in sciatica the eponym of which, contrary to the current medical world's opinion, ought to be *the Lazarević sign* and not *the Lasegue sign*, since it was Lazarević who first described the sciatica symptom in a medical journal.

Among many who substantiated his findings was the American neurologist Robert Wartenberg who admitted: *The best known nerve stretching tests is the straight-leg-raising test or the so-called Lasegue sign. Historically he introduced this test, but he never described it. This was done by his pupil Forst in 1881. Earlier, in 1880, the test was described by the Serbian clinician Lazarević of Belgrade.*

In 1881 Lazarević opened the first department of geriatrics in Belgrade outside the department of medicine, thus defeating the world founder of modern geriatrics J.X. Nasher, the American physician, who did the same thing in 1909.

This article is a tribute to Lazarević's medical achievements Although he was a famous author he could have been admitted into the Serbian Royal Academy barely on the grounds of being a prominent physician-scientist.

Authors: *Kanjuh, Vladimir; Pavlović, Budimir*



Marko LEKO
(1853–1932)

Marko Leko was one of the most prominent chemists and founder of applied chemistry in Serbia.

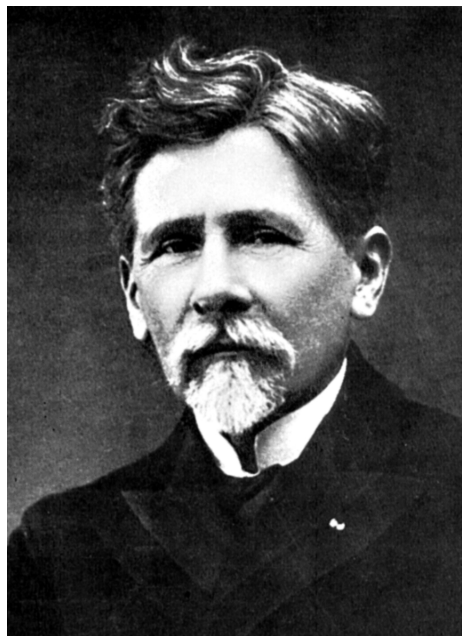
He graduated chemistry and chemical technology under the supervision of Prof. V. Meyer in Zurich and defended his doctoral thesis in 1875. He taught chemistry at high school (1880-1884), at a military academy (1881–1894), and Belgrade College (1894–1896 and 1899–1905). He worked as a chemist at the State Chemical Laboratory from 1884 and was its director from 1904 until 1920. He was Dean of the Faculty of Philosophy (1901) and Rector of Belgrade College (1902–1904).

After World War I, he was involved in the humanitarian work and from 1924 onwards he was the president of the Red Cross Organization.

Bibliography of Marko Leko lists about 150 pieces of writing, out of which almost 100 are on the subject of chemistry. In his early years he was engrossed in organic chemistry and, from the mid-eighties, as a state employee he switched his attention to analytic chemistry. Two of his works in organic chemistry (one on constitution of ammonium chloride and the other on phenylhydrazine) are still quoted in books about the history of chemistry, and a few of his works on analytic chemistry (studies on mercury and sublimate in toxic occurrences, determination of glycerin in wine) were quoted in German textbooks and manuals at the time.

Leko was a member of the Serbian Learned Society, an honorary member of the Academy of Sciences, president of the Serbian Agricultural Society, president and a member of many domestic and international societies and committees.

Author: *Bojović, Snežana*



Sima LOZANIĆ
(1847–1935)

Sima Lozanić was one of those outstanding individuals who lived at the turn of the 20th century and who left their mark on European science. He promoted the development of the young Serbian state by taking part in the country's economic, industrial, political and cultural life and thus helping Serbia join the ranks of Europe's progressive states. Sima Lozanić was a chemist, scholar and professor, a president of the Academy of Sciences, the first president of Belgrade University, a Minister of Economy and Foreign Affairs. He was a diplomat and a war veteran who fought in the 1876–78 wars, the 1912 Balkan War and World War I.

He was born in Belgrade, on February 24, 1847. After finishing primary and secondary education, he studied law at Belgrade College.

Following that, he spent four years in Zurich and Berlin where he studied chemistry under the eminent scientists Wislicenus and Hoffmann in whose laboratories, in those days, chemistry was turning into an exact and modern science. In 1872, after retuning to Belgrade, Lozanić joined the Chemical Department of Belgrade College and taught chemistry, with occasional interruptions, until 1924. He heralded a new, modern era in the study of chemistry in Serbia and paved the way for the development of modern chemistry by incorporating the latest discoveries in his teaching syllabus and his textbooks.

In 1905, when Belgrade College became Belgrade University, Lozanić was appointed chairman of the Belgrade University Board. He later became the first University president and in that capacity was able to exert influence and thus help upgrade the standards of studying and raise them to a university level.

During nearly sixty years of research work (1871–1929), Lozanić published about 200 scientific and research essays and articles. The most important ones were on the subject of organic chemistry (23) and electrochemistry (9). The impact, which some of them had on science, helped them survive to the present day and they are still being referred to. His contemporaries considered his study of natural resources of his own country (articles about ores, minerals, meteorites, and mineral springs) his most important piece of work. As the only available chemist of his time, Lozanić was also commissioned by the Ministry of Finances and other institutions to do some practical projects. Many of his analyses, which he conducted as the *state examiner of ores and false coins*, were preserved. Research work, which was very time consuming and often kept him away from teaching, remains unmentioned in his academic opus but was nonetheless of great benefit and importance to the new state.

Apart from scientific and professional commitments, Lozanić was also active in politics (1894–1903). He carried out several mandates as Minister of Economy and Foreign Affairs, and was an envoy to London for over a year. His organizational and professional skills became apparent especially during his term of office at the Ministry of Economy. His participation in the drafting of economic legislation, laid the foundations for Serbia's rapid economic growth in the early years of the 20th century.

In 1872, at the age of 25, Lozanić became a member of the Serbian Learned Society. Two years after the Academy of Sciences was founded (1883), he became its corresponding member, and in 1890 its full member. He was twice elected president of the Academy – in 1899 and in 1903. He was president and a member of many Serbian and foreign sci-

entific and professional societies and an active participant of many scientific and cultural activities of his time.

In 1922 Belgrade University commemorated the 50th anniversary of Sima Lozanić's academic and scientific career at which time he was awarded an honorary doctorate by the Faculty of Philosophy. Two years later Lozanić retired but, nonetheless, continued to work until 1929. He died in Belgrade on June 7, 1935, at the age of 88.

Author: *Bojović, Snežana*

Luka MARIĆ
(1899–1979)

Luka Marić was born in the little village of Papići, Banija region, in 1899. He finished elementary school in the nearby village of Meninska and grammar schools in Petrinja and Karlovac. He maintained strong ties with his native country throughout his life which was one of the main features of his personality. From 1918 to 1922, Luka Marić studied at the Faculty of Philosophy in Zagreb, Department of Natural Sciences and Chemistry, focusing his interests on petrology and mineralogy. After graduating from the Faculty, he worked as a grammar school teacher in Srbobran and Ogulin. He undertook a study-visit to Paris, after which he returned to Zagreb and accepted the position of a curator at the Museum of Mineralogy and Petrography in Zagreb (1925–1931).

From the Museum he went to the Technical Faculty in Zagreb, where he was appointed assistant professor for the subjects of mineralogy, petrography and geology. In 1939, as an associate professor, he helped with the setting up of the Mining Department of the Technical Faculty. Following the occupation of 1941, Prof. Luka Marić fleeing from the Ustashas arrived to Ljubljana where he taught students at the Mineralogical Department of Ljubljana University. After the liberation, he returned to Zagreb and resumed his employment at the Mining Department at the Faculty where he was appointed full professor in 1948. Even after he stopped working officially in 1969, academician Luka Marić continued with his activities at the Department devotedly and enthusiastically but occasionally, and also due to his ill health, he went to Tijesno, a little town on the Adriatic coast near Šibenik, and worked there.

Luka Marić's first major scientific endeavour was his doctoral dissertation entitled *The Jablanica Gabbro Massif*, defended at Belgrade University in 1928. Using mineralogical, chemical and geological data, Marić made a new approach to the study of magmatic rocks which he adhered to in his work all his life. Constantly improving and keeping abreast of the latest methods, Prof. Luka Marić studied magmatic rocks found in the vicinity of Bor (Eastern Serbia), young volcanics of ore-bearing Zletovo region (Eastern regions of the Former Yugoslav Republic of Macedonia), Triassic volcanic rocks of Ljubišnje (Northern part of Montenegro) and others.

Some of his other scientific works, equally important, relate to *terra rossa* and bauxite origins. He also studied changes in chemical forces in general and of certain minerals of primary rocks and bauxite, using the genesis of bauxite in those investigations. Academician Luka Marić also produced first written works on sedimentation and petrography. His article *Supplement to Petrography from Stara Raška* was published in *The Herald* of the Serbian Academy of Sciences and Arts in 1933. More works treating these issues followed and were published. He also studied metamorphic rocks of Macedonia and Eastern Serbia, as well as anchimetamorphic rocks of Banija and Bosanska Krajina.

Academician Luka Marić taught over 35 generations of engineers: geologists, mining engineers, civil construction engineers, etc. Many doctoral dissertations were defended under his mentoring. He lectured by invitation at the universities of Warsaw, Paris, Bon, Berlin and many other cities, and published about 110 scientific papers. Naming a mineral discovered by his students after him, *the Maricite*, was the best way to acknowledge his scientific achievements.

He was president of the Croatian Geological Society, president and a member of Yugoslav delegations at congresses of the Carpatho-Balkan

Geological Association, chairperson of many Yugoslav geological seminars, etc.

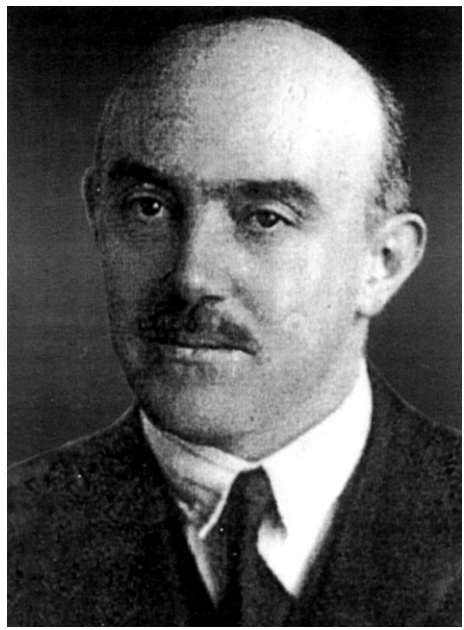
Academician Luka Marić was elected corresponding member of the Serbian Academy of Sciences and Arts in 1955, and full member of the Yugoslav Academy of Sciences and Arts, in 1963. He actively participated in the working of both Academies.

Academician Luka Marić introduced into Serbian and Yugoslav petrology new chemical approaches to the study of rocks; these being a systematic correlative mineralogical analysis of magmatic and metamorphic rocks and a detailed and complex examination of bauxite as product of weathering and diagenetic processes.

He was also very active with the Serbian Cultural Society *Prosvjeta*, which brought together the Serbs in Croatia with the aim to preserve their cultural and national heritage.

Academician Luka Marić was an outstanding person, a man of enormous energy, broad horizons, and open to latest scientific developments. He was active until the last day of his life and left not only extensive but very important work opus of great benefit to our science. He was highly respect by scientific circles across Yugoslavia.

Author: *Karamata, Stevan*



Sima MARKOVIĆ
(1888–1939)

Sima Marković was born on November 8, 1888. His father, Miloš Marković, was the Principal of Kragujevac Grammar School, a delegate to the Parliament and one of the founders of the National Radical Party. Sima Marković graduated from Kragujevac Grammar School in 1907, as the best student in the class. He studied mathematics at Belgrade University where, under the mentoring of Mihailo Petrović, he obtained his Ph.D. in the subject, in 1913. His thesis entitled *General Riccati Equation of the First Order* was the second doctoral dissertation defended in Serbia in those days.

He was appointed assistant professor at the Faculty of Philosophy in Belgrade at the beginning of 1920, but the verification of his employ-

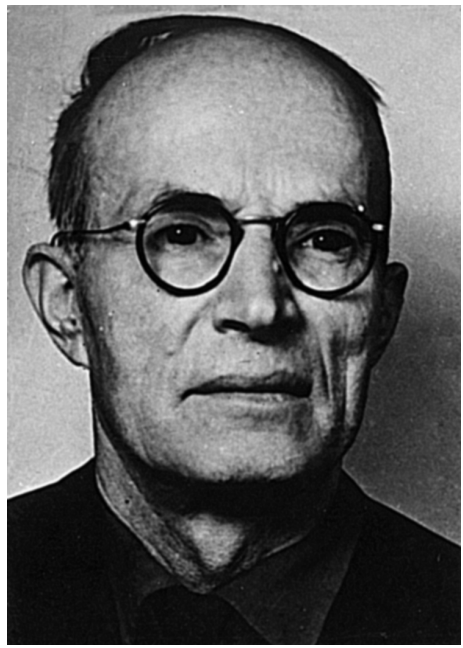
ment was never made. Soon after the *Obznana* (Proclamation) was declared, he was expelled from the University.

At the 1920 Congress of the Yugoslav Communist Party, in Vukovar, Sima Marković was elected secretary of the newly founded Communist Party. He was also elected deputy to the Constitutional Assembly and president of the Deputy Club. The same year he became a high ranking official of the Comintern. Between 1920 and 1935, Sima Marković was persecuted by the regime. He was imprisoned several times and finally, in 1933, exiled to Plevlja and Čajniče. The Communist Party of Yugoslavia was suffering from severe internal conflicts over the so called national question in those days, and Sima Marković, being the leader of *the right wing* came into conflict with the Comintern and Stalin. He acknowledged the existence of Serbia's imperialist policy but did not consider a break-up of Yugoslavia a beneficial option for the Yugoslav peoples. He was excommunicated because of such attitude and finally expelled from the party in 1929.

Despite being affected by aggravating circumstances caused by the expulsion, and without a career, Sima Marković continued to broaden his interests and knowledge of various scientific disciplines. His was particularly captivated by Marxism. His works which deserve mention are: *Science and Philosophy* (1925), *Principle of Causality and Modern Physics* (1935), and *Study of the Dialectical Materialistic Criticism of Kantian Philosophy* (1936). Sima Marković ranks among our greatest Marxist philosophers in the period between the two World Wars. His popular study on Einstein's theory of relativity, written during his imprisonment in 1924, was well received by the public.

In 1935, after escaping exile, Sima Marković reached Russia. There he found a position of an associate at the Institute of Philosophy of the USSR Academy of Sciences. Until recently there existed many open questions concerning the last years of his life. However, recently opened Russian archives revealed that Sima Marković had falsely been accused of being a member of the *Rightist Trotsky Terrorist Organization* and of collaborating with the British Intelligence. He was sentenced to death and executed the same day, April 19, 1939. That was the end of Serbia's prominent intellectual and a public activist who was rehabilitated in 1958.

Author: *Rašković, Miodrag*



Petar MARTINOVIĆ
(1897–1984)

Petar Martinović was born in Podgorica, Montenegro, in 1897, and educated in Podgorica and Cetinje. He belonged to the generation badly affected by the 1912 Balkan War and World War I. He lost his father in the former and was taken prisoner in the latter war by German and Austrian forces. He was barely 16 years old. After World War I, the International Serbian Education Board from New York, represented by Dr. Rosalia Morton, its founder and Chairman, decided to take a group of 60 youngsters from Yugoslavia, victims of the recent wars, to the United States and give them an opportunity to study at American universities. Prominent American families agreed to cover the expenses and thus rec-

ompense the youngsters for all which their families had been through because of the wars and for the damaging effects the wars had on their country. Petar Martinović, one of the 60 youngsters, enrolled at the College of Agriculture at the University of Syracuse in 1920. After graduating *cum laude*, he went to the College of Philosophy at the same University in 1926, choosing zoology as his main subject and receiving his master's degree in biology in 1928 for the paper entitled *Postnatal Oogenesis in the Mammals.*

Martinović returned to Belgrade in March 1929, and began working at the Central Institute of Hygiene. In 1932 Belgrade University awarded him a Ph.D. title for the thesis *Oogenesis in the Cats – Postnatal Development of Oocytes.* He then went to Novi Sad and together with Dr. Dušan Zamurović set up and led the first State Laboratory for Experimental Medicine and Biology in Serbia. Following a suggestion of Dr. Dušan Kanazir, Pavle Savić, the professor of physical chemistry and Director of the Vinča Institute, tried to form a research group and so he invited Dr. Martinović to help launch biological research at Vinča. Dr. Martinović readily went to Vinča to organize experimental endocrinology.

Dr. Martinović's professional life is a story of a person endeavouring to achieve perfection. Between 1926 and 1958 he worked very hard to learn the newest techniques, and keep abreast of the latest developments and results of scientific research. He went abroad, worked and attended courses (on human pathology, tissue culture etc), visited various research centers, gave lectures at many universities as a fellow of various institutions (the WHO, Rockefeller Foundation, Commonwealth Fund, British Council, Yugoslav Commission on Cultural Cooperation). The places where he spent most time improving himself were: Strangeways Research Laboratory at Cambridge University, Great Britain; Osborn Zoological Laboratory at Yale University, Cooperstown in New York, Marine Biological Laboratory in Woods Hole, USA.

He became known for having successfully developed the nucleus of experimental biological work at a universal level. As the Head of the Laboratory for Embryological and Endocrinological Research at the Institute of Nuclear Sciences at Vinča, Belgrade, he initiated and promoted experimental endocrinology, which under his guidance earned worldwide reputation. His experiments focused mostly on studying culture of the mammal endocrine glands, transplantation of the chicken embryo's head, hypothalamic and extra hypothalamic control of the hypophysial function, effect of X-rays on the grafted hypophysectomized and adrena-

lectomized rats. Problems of sex morphology and physiology attracted his greatest attention. Experimental histology, in the first place transplantation and explanation of the mammal tissues and organs, was in the narrow focus of his research plans. He always tried to provide a lot of proof for his experimental work which was highly regarded by foreign as well as Yugoslav scientists.

He developed a special technique of growing culture of the endocrine glands *in vitro,* accompanied by transplantation of the culture into the anterior eye chamber, the procedure unheard of elsewhere in Europe. The protective effect of the embryonic extract, which he discovered, was extremely important from the immunological point of view and deserves highest praise (Prof. Dr. Z. M. Bacq and Dr. P. Fischer, University of Liege, Belgium).

Papers of Dr. Martinović and his associates represent a significant and original contribution to science and have not only theoretical but practical importance for applied biology, i.e. human and animal medicine. With brilliant results achieved in the field of experimental endocrinology, embryology and immunology, Dr. Martinović spread the fame of Serbian science around the world and thus increased the reputation of Serbia and the Institute of Nuclear Sciences at Vinča.

Dr. Martinović was elected corresponding member in 1958 and full member of the Serbian Academy of Sciences and Arts in 1961. In 1959 he became a corresponding member of the Yugoslav Academy of Sciences and Arts. He also was a member of the International Society of Cell Biology, International Society of Experimental Biology, International Society of Development Biology, American Society of Tissue and Organ Culture, American Society of the Sigma Xi, European Society of Tissue and Organ Culture, European Society of Comparative Endocrinology, Yugoslav Society of Biologists and Yugoslav Society of Physiologists.

He was the recipient of *the Medal of Labour with the Red Flag* (1961), *the Medal of Labour with the Gold Star* (1965), *the Order of Merits with the Gold Garland* (1977), *Belgrade October Prize* (1957), *the AVNOJ Award* (1973), *the Serbian Academy of Sciences and Arts Medal* (1959) and *the Serbian Biological Society Charter.*

His experiments were interrupted on two occasions, first at Novi Sad and then at Vinča, because resources were not sufficient. He ended his career with a poignant feeling of frustration realizing that he would never again be given opportunities to complete some of his research.

Dr. Martinović remained at Vinča until 1970, when he retired from work, but his dedication to science lasted until the end of his life. He died in 1984 and was buried in the Lane of the Great at the Belgrade New Cemetery. One street in Belgrade bears his name.

Authors: *Kanazir, Dušan; Martinović, Jovo; Milovanović, Olivera; Naumović, Smiljana*

Vukić M. MIĆOVIĆ
(1896–1981)

Vukić Mićović, a descendant of the Vasojević tribe from Montenegro, diligent student of Podgorica and Belgrade Grammar Schools, Montenegrin Army soldier, prisoner in Austro-Hungarian war camps, student of Sima Lozanić and admirer of his ideas, holder of the French Government grant, collaborator of the Nobel Prize recipient Robert Robinson, professor at Belgrade University, Head of the Chemical Department, Administrator of the Chemical Institute, Dean of the Natural Sciences and Mathematics Faculty, Rector of Belgrade University, founder of modern chemical school in Belgrade, academician, Secretary at the Serbian Academy of Sciences, honourable head of his family. The

above list summarizes his professional and scientific achievement. The portrait however is not complete for people that knew him well and worked with him, or generations of students that he taught.

Honesty, firm discipline, natural talent and courage were instilled into Vukić Mićović in his native land, around the highlands of Mt. Komovi. His parents brought him up in the spirit of preserving and cherishing old family traditions. While listening to the *gusle*, a type of national one-string instrument, he became inspired by heroic epic poetry played on them. His family breeding had a profound impact on his development as a person, and also influenced decisions that he made during his lifetime. These virtues, deeply rooted in his homeland, good education which was passed onto him by the famous professors Ibrovac, Kangrga, Sima Lozanić, Vavon, Robinson, scientific curiosity and intuitiveness, perseverance, and above all, great sense of responsibility, enabled Vukić Mićović to give shape to everything he engaged in and leave deep trace on science. With all said, he qualifies to join the Pleiad of the most prominent and influential Serbian scientists of the 20th century.

The scientific creativity and achievements are characterised with exact and systematic approach towards problems. He was first to address the problem of oregano-magnesium compounds and to use lithium-aluminium hydrid for reduction of organic compounds. He produced the first textbook on stereochemistry in the world, and discovered, for that time, the best method of esterification of carboxylic acid. Mićović wrote the first monograph about this reagent, discovering new reaction of alcohol. He also explored scientific areas which the most distinguished scientists at the world universities also dealt with.

He was eloquent and a great expert in organic chemistry. He expressed himself clearly and concisely, and had lectures extremely well attended. He considered his lectures, students' exams and education in general to be his sacred duties.

Mićović tried to make the subject of chemistry understandable and the science of chemistry acceptable by as many professionals as possible. He strove for better utilisation of this science and its achievements. He taught chemistry at University, gave lectures to school pupils and teachers, greatly popularised chemical science on the radio and television, and in specialized schools.

In the course of his successful fifty-year-long career, Mićović was fully dedicated to science and University. He produced significant results in experimental work, wrote and translated books and textbooks, scientific papers and monographs. He was mentor to many young researchers and helped them in their professional development. He even entered the politics, with the aim of helping University and promoting chemical science.

He put all his efforts into popularizing chemistry. He brought the same élan and studious attention to everything he did. He detested improvisations and never left anything to chance. He performed all his duties most seriously, courageously, and with great resolve. He believed that whatever needed doing, it had to be done. When he decided on a task, he did not spare energy to complete it. He was prepared to sacrifice himself for a moral or patriotic cause

Vukić Mićović was engaged in many public activities. He was a distinguished Serbian scientist. His exemplary way of teaching to the utmost of his professional abilities inspired young people at University to embark on creative scientific journeys, and he was convinced that the meaning of life was found only in a free, creative work.

Author: *Čeković, Živorad*

Jelenko M. MIHAILOVIĆ
(1869–1956)

Jelenko M. Mihailović was born in Vrbica, near Knjaževac, on January 11, 1869 and died in Belgrade, on October 30, 1956. He was the founder of Serbia's seismology, a high school teacher, Geology professor at the Faculty of Philosophy, professor at the Faculty of Agriculture and Forestry, Dean of the Teachers' Training College and Vice-President of the Central Educational Board. He published many works on the subject of geology and, particularly, seismology of our country. He also authored a number of textbooks and popular scientific books.

Jelenko M. Mihailović was born into a family of teachers. After leaving school, he enrolled at Belgrade College, the Natural Sciences and

Mathematics Department. A very diligent student, he graduated on June 30, 1892. He worked as a science teacher at High Schools and the Teachers' Training Colleges in Niš and Kragujevac. In 1895 he accepted a more permanent position as a teacher at the First Belgrade Grammar School for Boys. He was totally committed to his work and is remembered as one of the most admired high school teachers of his time.

Soon after the Meteorological Observatory of Belgrade College was established in 1897, he was appointed assistant lecturer for the subject of astronomy and keeper of meteorological and astronomical instruments. He then set out to open meteorological stations throughout Serbia. In 1906 he and Svetolik Radovanović started seismological research projects at the Institute of Geology of the Faculty of Philosophy. The project work was interrupted by the Balkan Wars and World War I when Mihailović, as a reserve corps officer, went to fight for liberation. After the Serbian army retreated through Albania, he was sent to France with Serbian pupils, and was one of the organizers of their further education there. Not long after the war, the Seismology Station became the Institute of Seismology, and Jelenko Mihailović was appointed its first Administrator. Nevertheless, he actively pursued his other interests and successfully continued his teaching career. In 1932 he was appointed Rector of the Teachers' Training College in Belgrade while keeping the post of the Vice-President of the Central Educational Board, and teaching the subjects of meteorology and climatology at the Faculty of Agriculture and Forestry in Belgrade on a part-time basis. He was also a member of several state committees of the Kingdom of Yugoslavia.

After World War II, he remained at the helm of the Institute of Seismology and was also greatly responsible for the setting up and the development of seismological stations in Skopje, Sarajevo, Titograd and Ljubljana. He died after a short illness in Belgrade, in 1956. The first seismological surveillance was conducted in our country even before 1906, but with relatively little success. Only when, thanks to Svetolik Radovanović, the then Administrator of the Institute of Geology at the Faculty of Philosophy, Jelenko Mihailović joined the research team, did seismological surveillance thrive, placing Serbia in the company of Europe's most advanced countries at the time. The fact was corroborated at international seismological gatherings held in Rome, The Hague, Cermat and Manchester which Mihailović attended. Having successfully represented Serbia abroad, and using his enthusiasm and his authority, he managed to procure the funds for the construction of the first seismological station in our country. The building, designed according to high professional standards, was completed in 1909. The planners had the fore-

sight to choose the right location for the Seismological Institute of Belgrade which is still housed in the same place.

The Institute has, with minor interruptions, been registering earthquake ever since August 8, 1909. Mihailović tried his best to facilitate the development of instrumental seismology and managed to obtain relatively new equipment for the Institute. He very early outlined the basic goals of his research which aimed to: 1) delineate various epicentral regions in Serbia and studying of their seismic uniqueness; 2) establish local habitual quake lines; and 3) determine a correlation between the obtained results and the geological structure of the terrain, whereby he directly linked seismology with geology and tectonics and laid the foundations of seismotectonics, seismogeology and other disciplines. With newly acquired experience he clearly charted the further development of seismology, and observing the periodicity of quake phenomena, made the first steps in long-term earthquake forecasting, seeking to elaborate methods of defence and protection against disastrous earthquakes.

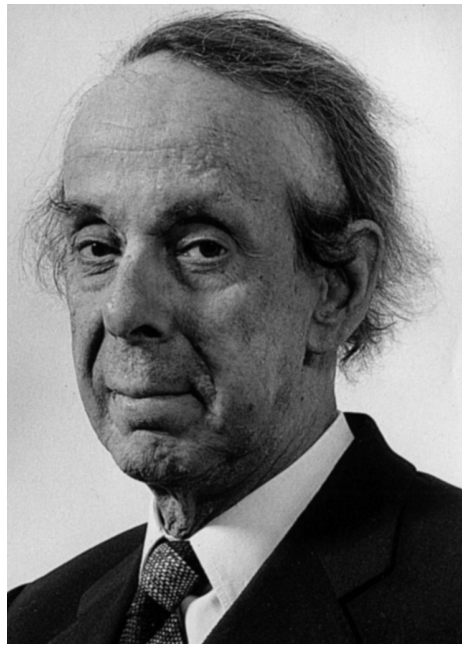
Aware of the fact that the limited financial resources at his disposal would preclude the kind of upswing in instrumental seismology which would elevate it to a level which he considered appropriate, he developed other ways of collecting data about earthquakes. Thus already in 1906 he laid the foundations of macro seismology preparing the first manual for the observation and registration of earthquakes. He additionally collected historic records on earthquakes so that over a brief period he secured detailed data on the quakes which had hit our regions. Using the acquired data, he compiled a catalogue of earthquakes encompassing all the quakes on the Balkan Peninsula from the year 306 to date, with detailed descriptions of particularly the quakes which demolished Skupi in 518, Herceg-Novi and Dubrovnik in 1667, as well as a number of other places. He presented the final version of the catalogue at a congress in Prague in 1927. In the area of short-term earthquake forecasts, he pursued a bi-directional line of research, examining the association between ground waters and the incidence of earthquakes as well as the correlation between changes of the position of geodetic points and earthquakes. Although he was indeed ahead of his time in this research, financial constraints hindered his more detailed research likely to produce more concrete results.

He very early realized the need for seismic research to be undertaken on as wide an area as possible, and by adhering to the idea made several attempts at establishing a seismological service on the national level or indeed regional level, encompassing the Balkan Peninsula in that case, and to that end he consulted eminent seismologists from neighbouring countries. Regrettably these attempts bore no fruit.

Jelenko Mihailović was the recipient of numerous honours for his inexorable scientific and pedagogical work. For his many years in education, he was awarded *the Order of St. Sava of the 3rd and 4th Class*. As a 1912–1918 war veteran, he was decorated with the *Albanian Memorial Medal* and *the Special Silver Medal for Merits.*

The Serbian Geological Society awarded him a special diploma for his outstanding achievements in geology and seismology and *the Order of Labour of the 1st Class*.

Author: *Banjac, Nenad*



Mihailo LJ. MIHAILOVIĆ
(1924–1998)

One of Serbia's most prominent scientists from the second half of the 20th century, Mihailo Lj. Mihailović, was born in Belgrade, on January 22, 1924, to an old middle-class family. His father Ljubomir was a diplomat, and mother Božana (née Bartoš) a physician. He finished grammar school in Belgrade, in 1942 and graduated from the Chemical Department, the Faculty of Science of Belgrade University, in 1950. Mihailović was appointed (1950) assistant at the Institute of Chemistry of the Serbian Academy of Sciences. He wrote his doctoral thesis in the field of organic chemistry, under the mentor V. Mićović, and received his Ph. D. degree from the Serbian Academy of Sciences. From the Institute

Mihailović moved to Belgrade University and was appointed assistant professor at the Chemical Department.

Mihailović spent two years (1957-1959) working as an assistant to Prof. Vlado Prelog at the Institute of Organic Chemistry of the Technical College in Zurich, Switzerland. He was first appointed associate professor (1961) and then full professor (1968). He taught advanced courses in organic chemistry. In 1967 he went to the USA and spent one semester lecturing at Wisconsin-Madison University, and one at Cornell University at Ithaca. He participated as a lecturer in many international and national scientific meetings all over Europe and the USA and was also invited to talk about his work at many well known universities and scientific research centers.

Mihailović taught the following courses: theoretical basics of organic chemistry, advanced organic chemistry with stereochemistry, physical organic chemistry and conformational analysis. He is author of the textbook *Theoretical Basis of Organic Chemistry and Stereochemistry*.

His scientific opus is impressive but his main interests lay in the fields of organic chemistry and natural products chemistry. He discovered many new organic reactions and made synthesis of numerous new organic compounds and natural products. He studied reduction of organic compounds by complex metallic hydrides, structure elucidation of some antibiotics and investigated the chemistry and biochemistry of phosphorous in wheat.

Mihailović's discoveries of new oxidative reactions of alcohols by mean of lead tetraacetate, such as introduction of the ethereal oxygen functional group onto the remote nonactivated carbon atoms, and fragmentation of hydroxy steroids affording secosteroids with 10 membered rings and steroklastans with 14 membered rings, as a parts of modified steroids skeleton, are exceptionally important. Using these methods he made synthesis of numerous derivatives of modified steroids and investigated their chemical reactivities as well as biological activities.

The range of Mihailović's scientific activities was really extensive and included the studies of molecular rearrangements, free radical reactions and intramolecular heterocyclizations of unsaturated alcohols by using some oxidative and acidic reagents. He pioneered the application of modern instrumental methods in ascertaining the structure and stereochemistry of organic compounds and natural products.

Mihailović published hundreds of articles, monographs and reports in renowned international and national periodicals. The world's famous publishing houses printed his books. He was one of Serbia's most fre-

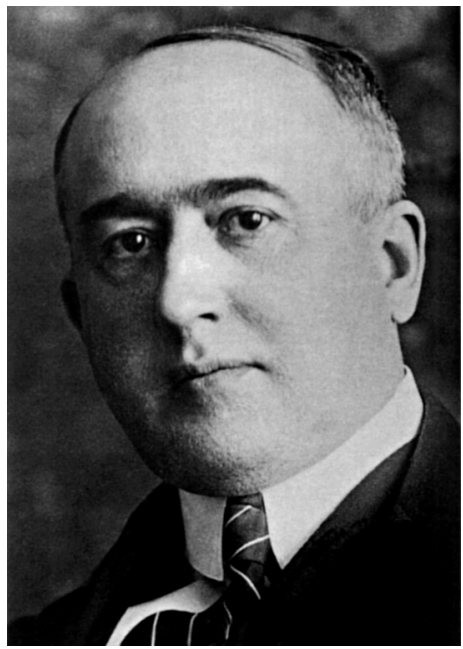
quently quoted scientists. His papers and articles were mentioned in many reports and textbooks of well-known international publishers.

Because of his contributions to science, Mihailović was elected into the Serbian Academy of Sciences as one of the youngest corresponding members (1961). In 1965 he became its full member. He was also a member of the Slovenian Academy of Sciences and Arts (1977), Yugoslav Academy of Sciences and Arts, Zagreb (1981), New York Academy of Sciences, (1982) and Academia Europea (1989).

Mihailović entered numerous chemical societies and associations: the Serbian Chemical Society, Croatian Chemical Society, American Chemical Society, Swiss Chemical Society, Royal Society of Chemistry (London), French Chemical Society, German Chemical Society, Royal Netherlands Chemical Society, International Society of Heterocyclic Chemistry, European Photochemistry Association and the Commission on Physical Organic Chemistry of the International Union of Pure and Applied Chemistry.

Prof. Mihailović was the recipient of the following awards: *the December Award* (1957), *the City of Belgrade October Award* (1969), *the 7th July Award* (1978), *the AVNOJ Award* (1983), *the Prix d'Auamale Award* (Institut de France, 1985), *the Medal of the Serbian Chemical Society for Outstanding Scientific Achievements* (1988), *the Legion d'honneur Medal* (1989), and several other Yugoslav decorations and medals. Prof. Mihailović, the founder of modern organic chemistry in Serbia, a man of many interests and simplicity of interpretation, is truly one of Serbia's most outstanding scientists.

Author: *Čeković, Živorad*



Milutin MILANKOVIĆ (1879–1958)

Milutin Milanković ranks among those great scientists of the world who have marked the 20th century, in recognition for which a crater on the Moon, another on Mars and a planetoid bear his name.

He was born on May 16, 1879 in Dalj near Osijek (Croatia) and died in Belgrade, on December 12th, 1958. He was buried in his home-town of Dalj. The Milanković family was of Serbian ancestry, old and respectable. His grandfather Uroš was a philosopher (*The Organism of the Outer Space*, Vienna 1845) and the other, Mita, was Chief-of-Staff of the Serbian Army during the reign of Prince Mihailo. His uncle Andra Radovanović was a design engineer with interests in the Škoda factories,

and his uncle Vaša Muačević was the Administrator of the Patriarchate's estate in Dalj. He was the son of Milan, a reputable merchant, and Jelisaveta, née Muačević. He was married to Kristina, née Topuzović, by whom he had a son, Vasko, who now lives in Australia.

Milanković attended elementary school in Dalj and finished Osijek Grammar School in 1896. He was awarded a bachelor's degree in civil engineering in Vienna, in 1902 and was the first Serb to be granted a Ph. D. from the Vienna School of Engineering, in 1904. From 1905 to 1910, he worked in Vienna as a design engineer – becoming a pioneer in the design of reinforced concrete buildings. At the same time, he was engaged in designing the sewerage system in Belgrade, a task set by his Viennese employers. At the recommendation of Mihailo Petrović and Jovan Cvijić, he was elected associate professor of applied mathematics at the Faculty of Philosophy in Belgrade, in 1909. He took part in the First Balkan War (1912) while during World War I (1914–1918) he was confined to a camp near Budapest in Hungary.

Milanković became a full professor in 1919, first corresponding and then full member of the Serbian Royal Academy in 1919 and 1920 respectively, and was elected member of the Yugoslav Academy of Sciences and Arts in 1920. In 1927, he became an honorary member of the *Matica Srpska*, prestigious Serbian literary and cultural society. The Serbian Academy of Sciences and Arts elected him Vice-President in 1948, 1951 and 1954. He headed the Astronomical Observatory of Belgrade from 1951 onwards and was elected fellow of the Academy of Natural Sciences of Halle in 1955.

In Belgrade, Milanković's theoretical work could rely only on his remarkable powers of observation and great multidisciplinary knowledge of mathematics and natural sciences, since the University funds were limited. The underlying idea of his work was that the Earth's climatic variations were the result of regular changes in celestial mechanics (periodical change of tilt of the Earth's axis, eccentricity of the Earth's orbit and change of the ecliptic angle), which in turn cause cyclic changes in the intensity of insolation. Painstakingly elaborating the idea, he published *A Contribution to the Mathematical Theory of Climate* in 1912, and eventually arrived at his *Theory of Insolation of the Earth* (published in 1920). Coordinating his scientific work with Alfred Wegener, the father of modern geology, and the climatologist Wladimir Koppen, he completed his monumental work, *Kanon – The Canon* (1941), specifying accurately the periods of lower and higher insolation over the last million years of geological time. Milanković's *insolation curves* explained the climatic varia-

tions in the Ice Age. This theory was proven valid only after Milanković's death, on the basis of multidisciplinary studies of the ocean floor, for which a number of palaeonthological and geochemical methods had been used. With the publication of these results (*Science*, 1976) and staging of the symposium of historical momentum *Milanković and the Climate* (Columbia University, 1982), the world scientific community was informed of Milanković's cycles as one of the greatest breakthroughs of the 20th century which was applicable to all geological periods. Even some of the new branches of science (cyclostratigraphy, etc.) have been based on his cycles.

As well as designing reinforced concrete structures in Austro-Hungary, Milanković also designed a large number of civilian and military facilities in Yugoslavia (particularly between 1920–1941), including almost all airports, many fortifications, bank buildings, the Mint and some churches, too. He set the theory of virtual movement of the poles (1933), he determined the temperature on Mars (–17°C) in 1913, which was proven right only recently by direct measurement. Milanković produced the most accurate calendar so far (he reconciled the Julian and Gregorian ones), but it was not adopted, lacking consent of the church. He also wrote about Einstein's theory of relativity. As for his literary work, the following two popular science books stand out: *Kroz vasionu i vekove – Through Space and Centuries* (1943) and *Kroz carstvo nauke – Through the Empire of Science* (1950), as well as his autobiography *Uspomene, doživljaji i saznanja 1–3 – Memories, Experiences and Discoveries* (1952, 1957, 1979).

Listed below are Milanković's major works: *Distribution of Solar Radiation on the Surface of the Earth* (Belgrade 1913), *Theorie mathematique des phenomenes thermiques* (*Mathematical Theory of Thermal Phenomena*, Paris 1920), *Kanon der Erdbestrahlung und seine Anwendung auf das Eiszeitenproblem* (*Canon of Insolation of the Earth and its Effect on the Ice Age Problem*, Belgrade 1941; English edition, Jerusalem 1959, Serbian translation, Serbian Academy of Sciences and Arts 1997), *Calendar of the Earth's Past* (1926) and *Numeric Calculation of the Secular Trajectory of the Earth's Rotation* (1933).

Since 1976, Milanković's accomplishments have been increasingly recognised by the world scientific community; many scientific conferences on the elaboration and supplementation of his mathematical theory of climate have been held and his scientific citation index is rising enormously. In 1993, the European Geophysical Society instituted the Milutin Milanković Medal which, like the Nobel Prize, is awarded to scientists

from all parts of the world for their accomplishments in the field of climatology. The selected works of Milutin Milanković were published in eight volumes in Belgrade (1997) as a belated acknowledgement. The new edition of *Canon* in English was also published in Belgrade in 1998.

Milanković, although educated abroad, returned home to Belgrade, to start his theoretical work and win international fame.

Author: *Pantić, Nikola K.*

Žarko MILETIĆ
(1891–1968)

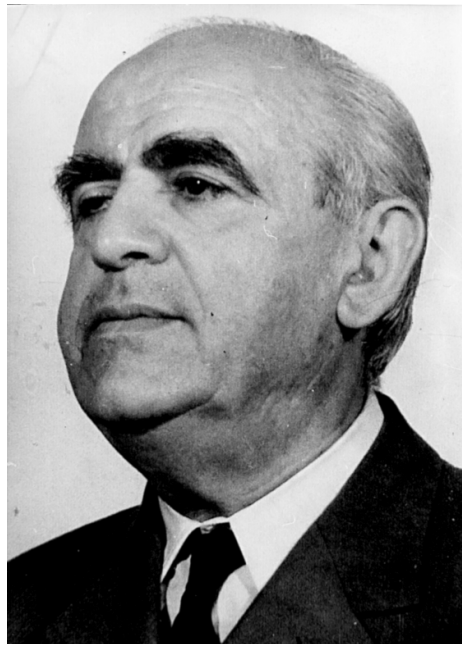
Žarko Miletić was born in Sisak, in 1891, and died in Belgrade, in 1968. He finished the Faculty of Forestry in Zagreb, in 1913. Between 1913 and 1921, Miletić worked for the forest management authorities, and in 1921 he was appointed Head of Forest Management and Planning Department in Zagreb. In 1927 Miletić obtained his Ph.D. title from the Faculty of Forestry in Zagreb. He then went to work in Serbia accepting various managerial positions in the Morava region. Highly qualified, he first became an inspector at the Ministry of Forestry and Mining in Belgrade, then a senior official at the same Ministry and finally assistant minister.

He specialized in Switzerland, France and Czechoslovakia and also undertook a number of study trips. In 1951 he retired in a ministerial capacity but was soon, by invitation, elected full professor for the subject of forest management and planning at the Faculty of Forestry, Belgrade University. The same year, Miletić became a corresponding member of the Yugoslav Academy of Sciences and Arts in Zagreb. In 1961 he retired from University.

Scientific activities of Žarko Miletić were entirely focused on forest management and planning. Results of his research appeared in his most important works *Basics of Different Age Forest Management and Planning,* and *Forest Management and Planning,* parts I and II. He spent his entire career trying to solve the problems of forest management and planning. He earned greatest respect for his life-time achievements, being one of Europe's most eminent scientists in the field.

As a token of appreciation for his contributions, the Faculty of Forestry in Brno, Czechoslovakia, named a part of experimental forest after him, a rare honour bestowed upon the chosen few.

Authors: *Milin, Živojin; Jović, Dušan*



Radivoj J. MILIN
(1912–1996)

Academician and professor, Dr. Radivoj Milin was born in Lalić on March 18th, 1912. He attended elementary school in his native town and grammar schools in Novi Sad, Bečej and Sombor, where he graduated in 1930. He studied medicine in Nancy, Paris and Belgrade, where he graduated in 1936. Both his life and his career were extremely dynamic, prolific and creative. Although his decision to commit himself to research was made rather early, due to various circumstances, it did not interfere with his practice as a physician, and for a while he successfully combined the two.

He practiced medicine in Vienna. During World War II he was sent to do forced labour in Homol (Hungary). In October 1944 he joined the

Yugoslav National Army, first as the Administrator of the Military Hospital in Bečej and then of the Army Hospital in Zrenjanin. He was demobilized as a major of the JNA. In 1946 he took charge of the Regional Section of the Outpatient Department in Bečej, later to become the Dministrator of the Public Hospital *Branko Orlandić* in Bar. After that he resumed his duties in Bečej. During his practice as a physician, Dr. Milin proved to be an outstanding professional, a committed practitioner of high moral standards, and a noble man.

Academician Milin never separated his educational activities from his research. On the contrary, he thought that, apart from being educationalist, university professors should be familiar with current scientific trends. As an educator, academician Milin started his career as an assistant professor at the School of Medicine in Sarajevo, in 1949. He was appointed associate professor in 1952 and full professor in 1959. While in Sarajevo, academician Milin founded and also headed the Institute of Histology and Embryology. Following an invitation from the Faculty of Medicine in Novi Sad, Dr Milin moved there, and was the founder and the Head of the Institute of Histology and Embryology for many years (1961–1980) as well as the Dean of the Faculty (1965–1969 and 1970–1971). During his academic career as a university professor in Sarajevo and Novi Sad, Dr. Milin taught 31 generations of medical students, 12 generations of veterinary students and 20 generations of biology students. He was also a teacher to young researchers on specializations and graduate students of medicine from our country and abroad. He was mentor to seven candidates working on their master's degrees and thirteen Ph.D. candidates and was a member of a great number of examination boards.

His meetings with R. Collin in Nancy and A. Kostić in Belgrade, at the Institutes of Histology and Embryology, where he was a volunteer student and a demonstrator, were crucial for his decision to work in the field of morphophysiology. Dr. Milin's investigations were of experimental and fundamental character. His scientific research mostly included neuroendocrinology that is investigation of certain ecological factors and their effects on histopathologic features of hypothalamo-hypophyseal and epithalamo-epiphyseal complex; neuroendocrine differentiations of ependymoma and certain physiologic conditions and various ages; effects of light, darkness, noise, fear, cold, irradiation and deep hypothermia. Pineal gland was a special area of his research and the findings were most important for science.

Results of investigations of academician Milin were presented at scientific meetings, mostly abroad (68), published in 169 articles and

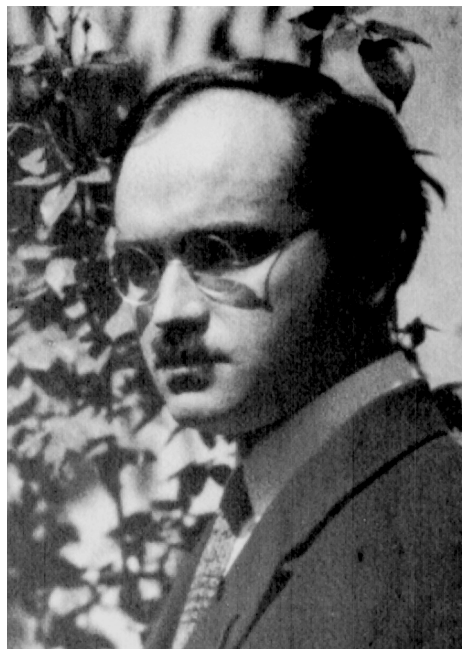
cited 558 times in textbooks, monographs and scientific papers of great importance.

Academician Milin was awarded numerous decorations for his dedicated work, namely: *the Medal of Labour of the 2nd Class, the Order for Merits with the Silver Wreath, the Palmes Academique* (France), and *the Order of Labour with the Red Flag.* He also received numerous awards in our country and abroad such as: *Laureate of School of Natural Sciences* in Nancy, *Laureate of School of Medicine* in Nancy; *the City of Novi Sad October Award; the 7th July Award, the 1985 AVNOJ Award.* For his outstanding professional and scientific results, he received honours from universities of Novi Sad, Liege, Bucharest, Szeged, Sarajevo and Brno. Academician Milin was a full member of the Serbian Academy of Sciences and Arts, a full member of the Academy of Sciences and Arts of Bosnia and Herzegovina, honorary member of the Medical Academy of the Serbian Medical Association, the Serbian Medical Association, the Italian Association of Anatomists, the Yugoslav Association of Endocrinologists and the Yugoslav Association of Anatomists. He was a member of many foreign associations, such as the International Society of Bioclimatology and Meteorology, the International Society of Psychoneuroendocrinology, the Royal Society of Medicine (England), Association des Anatomists (France), Anatomische Geselschaft (Germany), Sociata Italiana de Anatomia; Societe d'Endocrinologic (France), the European Society of Comparative Endocrinology, the European Cell Biology Organization, the Hungarian Society of Anatomists, Histologists and Embryologists, the Czechoslovak Anatomical Society, and Societe de Biologic (France).

Out of his great scientific opus came a number of especially valuable monographs and textbooks which are cited all over the world: Chevremont M: Notion de cytologic et Histologic. Ed. Descer, Liege, 1975; Selyc H. and Heuser G.: Fourth Annual Report on Stress Acta. Montreal, 1953; Tromp S. W.: Progress in Biometeorology Swet and Zeitlinger, Amsterdam, 1974; Vollrath L.: The Pineal Organ. Springer-Verlag, Berlin, 1981; Milin J.: Histologija. Visio Mundi, Novi Sad,1994.

Academician Milin died on August 23rd, 1996 leaving behind an outstanding opus worthy of deep appreciation. His extraordinary life achievements are a reminder of what an exceptional man, humanist, esteemed scientist, educator, professional and enthusiast Radivoj Milin was.

Author: *Popović, Dragiša*



Borivoje D. MILOJEVIĆ (1890–1968)

Borivoje D. Milojević was born in Belgrade, in 1890. After his father died, the family temporarily moved to Novi Sad, where he attended elementary and junior grammar schools. He graduated from grammar school in Belgrade, and in 1910 enrolled at the Faculty of Philosophy, Belgrade University. In May 1914, still a student of biology, he was appointed honorary assistant at his Faculty. He went to Bitola, that same year, to teach biology at a grammar school there, as a substitute teacher. During World War I he joined the Serbian army as a soldier-volunteer. After the War finished, he resumed his studies and graduated in 1919. The same year, on February 1, he was appointed teaching assistant at the Institute of Zoology, University of Belgrade.

On April 14, 1921 Borivoje D. Milojević received a Ph.D. in biology from Belgrade University. He spent a few months in Prague, Czechoslovakia, before going to England and Germany. In 1922 he was appointed senior lecturer at the Faculty of Philosophy, University of Belgrade. At the Institute of Zoology he taught a number of courses in cytology, histology, comparative embryology, inheritance, and general biology. In 1924 he was appointed honorary senior lecturer at the Faculty of Medicine, to teach a course on genetic inheritance as part of the biology syllabus of Prof. Živojin Djordjević. In 1925 he was elected associate professor, and in 1938 full professor at the Faculty of Philosophy in Belgrade. In 1938 he became the Head of the Biological Institute of the Medical School in Belgrade, and in 1940 he also taught biology course at the Faculty of Veterinary Medicine in Belgrade. From 1942 he was Director of the Serbian Natural Museum in Belgrade and he also taught biology at the Medical School during the spring of 1944.

After World War II, in 1945, Prof. Milojević took temporary retirement, but several months later he was appointed honorary director of the Natural Museum in Belgrade. In 1947 the Institute of Developmental Physiology, Genetics and Selection was established within the Serbian Academy of Sciences, and Prof. Milojević was appointed its director and scientific adviser. The Institute of Ecology and Biogeography and two scientific centers of the Serbian Academy of Sciences merged in 1956 into the Institute of Biology. Prof. Milojević was a member of the Institute and the Head of the Department of Physiology of Animal Development and Genetics when he retired in 1960.

Prof. Borivoje D. Milojević was undoubtedly one of Serbia's most distinguished teachers and biologists of the 20th century. His teaching career began in the mid-1920s, in Belgrade. He taught modern cytology, developmental biology and genetics to students of biology at the Faculty of Philosophy and Medical and Veterinary Schools. He was a highly critical scientist, who even passed judgment on Darwin's theory of evolution, which was a common topic of discussions among geneticists and evolutionists of his time. His consequent experiments with *Salamanders,* proving that patterns in skin figures are exclusively genetically controlled, have contributed clearly against Lamarckian and Lisenkoists approaches that acquired changes are inherited. His complex biosocial experiments with domestic bees are highly appreciated all over the world. His original work, *The Theory of Autosynthesis,* was of great value and could be used to complement Darwin's theory of natural selection. It explained the causes and routs of evolutionary development of different taxa and mechanisms of complex biological systems.

Prof. Milojević died in 1968, but the full value of his scientific and other life achievements still have not been recognized. Future will certainly corroborate the fact that he was one of the greatest biologists of the 20th century who devoted over 50 years of his life and work to cultural growth of our country and who was greatly respected all over the civilized world.

Authors: *Janković, Milorad; Marinković, Dragoslav*

Borivoje Ž. MILOJEVIĆ (1885–1967)

Borivoje Ž. Milojević was born on December 22, 1885 in Carina, near Pecka, Western Serbia, into a family of teachers. He died in Belgrade, on October 22, 1967. His father's work forced the family to move frequently from one place to another, and so the young Borivoje Milojević attended schools in many different places. He completed elementary school in Krupanj and Grammar School in Šabac and Belgrade. He enrolled at Belgrade University to study geography, and graduated in 1908. At Jovan Cvijić's suggestion, the diligent student Milojević was elected assistant at his school, and was also sent to Hale and Berlin to do specialist courses in 1911/12. During 1918/19 he was in Lausanne, Bern

and Fribourg for the same reason. He defended his doctoral dissertation in 1920 and, following the proposal of Jovan Cvijić, was immediately elected assistant professor. In 1921 he was elected associate professor and in 1927 full professor, the position he kept until his retirement in 1956. After graduating from University, he unexpectedly left it and went to teach geography in grammar schools in Valjevo, Čačak, Loznica and Belgrade. In autumn 1915, he retreated with the Yugoslav Army through the mountains of Albania and reached the Thessaloniki front.

No longer a student, Borivoje Ž. Milojević conducted antropogeographical and geomorphological field research. His teaching job did not get in the way of his explorations and he also managed to do some during the calm at the Thessaloniki front in the Aegean Macedonia.

He published the results of his investigations in his early works: *Radevina and Jadar; Pešter and Sjenica; South Macedonia; Kupreško, Vukovsko, Ravno and Glamoč fields; Glacial remnants in the area of Vlasulj; Bioča and Kručice, Geomorphological Investigations in the Valley of Cetina;* and others. After he returned to University in 1920, he started systematic, albeit regional, geographical research of large areas: the littoral, high mountains, major valleys and parts of the Pannonian lowlands. The results appeared in the following monographs: *Dinara Littoral and the Islands* (1933; 483 pages); *High Mountains* (1937; 459 pages); *Loess Surface and Planes* (1949; 100 pages); *Main Valleys of Yugoslavia* (1951; 447 pages). He also published a number of shorter, nonetheless comprehensive, local geographic monographs: *The Bay of Boka Kotorska; Mount Durmitor; Loess of Banat; The Velika Morava Valley; The Tara Valley; The Piva and Morača Rivers; The Valley of Lake Ohrid; Mount Prenj.*

Milojević laid the foundation stones of regional geography, one of the most complex geographical disciplines, and developed research methodology. He published many works about specific appearances of the Earth's surface: *Geographical Districtalization of the Earth's Surface; Upper Boundaries of Settlements.* He also wrote a number of articles on achievements of Jovan Cvijić and two voluminous manuals for teaching geography: *Our Areas and Yugoslavia-A Geographical Survey.* Results of his work and views on regional geography appeared in his remarkable textbook *Comprehensive Regional Geography* (1956; 451 pages). He published 67 works, many of them textbooks, in many foreign languages.

Milojević presented his papers at seven international conferences; at some even two. He was actively involved in the working of four congresses of Slavic geographers and etnographers. Along with Jovan Cvijić, he ranked as one of the most prominent Yugoslav geographers. He was an

honorary member of eight societies of geographers abroad and was granted four honorary Ph.D. titles from the most renowned universities. Milojević participated in the Paris Peace Conference in 1946. He was one of the founders of the Serbian Geographical Society in 1910. From 1920 to 1961, he was a very active member of the Society, and also editor of the existing, and founder of new, geographical periodicals.

His talents and qualities as a teacher were highly respected. He educated many generations of geography teachers at Belgrade, Skoplje, Novi Sad, Sarajevo and Zagreb Universities. He succeeded Jovan Cvijić and followed all of his ideas and endeavours. Milojević was aslo a full member of the Serbian Academy of Sciences and Arts.

Author: *Vasović, Milorad*

Branislav A. MILOVANOVIĆ (1908–1977)

Branislav Milovanović, the renowned professor of geology and palaeontology at Belgrade University, was born on February 6, 1908 in the town of Sopot, into a clerk's family. He studied at the Department of Geology and Palaeontology, the Faculty of Philosophy in Belgrade, from which he graduated in 1930. In 1931 he became assistant lecturer, in 1935 senior lecturer and in 1940 associate professor at the same faculty. During World War II, he was deported to Germany as a war prisoner and was later transferred to Serbia. Back in the country, he worked under supervision at the A. G. Antimon Company, in Western Serbia. He also was an adviser at the Institute for Geological Research after the war. In 1949

Milovanović resumed his post at Belgrade University. In 1951 he was appointed full professor at the Faculty of Mining and Geology in Belgrade. He was elected Head of the Department of Geology and Palaeontology (1949–1972), Vice-Dean (1950–1952 and 1954–1956) and Dean of the Faculty (1953–1954). He also worked at the Geozavod Institute (the Institute of Geology) in Belgrade, as the head geologist (1954–1964). Milovanović retired in 1972 and died on September 8th, 1977 in Belgrade. His entire life was dedicated to science and he was a very devoted university lecturer.

In over one hundred scientific papers which he wrote, Prof. Milovanović treated various subjects of geological science most thoroughly. His research into the palaeontology of *Rudists*, one especially interesting and completely extinct group of *Cretaceous Bivalvia*, particularly stands out. The study had a profound effect on the classical understanding of the morphology, histology, paleoecology, biostratigraphy, and the evolution of *Hippuritids* and *Radiolitids*, thus changing and expanding them. Milovanović described a number of new genera (*Yvaniella, Neoradiolites, Pseudopoly-conites, Rajka, Laskarevia, Vautrinia,* etc) and species. His meticulous study of the histological structure of the outer shall layer of *Rudists* introduced and developed a completely new method of determining *Radiolitids*, now know in science under his name. In 1936 he submitted a firm proof for two processes, which today are referred to as *phyletic gradualism* and *punctuated equilibria*. Especially important was the formation of Belgrade school for the study of Rudists, which for decades has been recognized as one of the world's four leading centres in this field.

Using various species within the genus *Pironaea*, sub-family *Lapeirouseiinae* and the supplementary fauna, Prof. Milovanović was the first to divide *Maastrichtian* into three parts. Besides, he claimed *Vrbovac beds*, identified and classically developed in Eastern Serbia, to be widely spread in the Mediterranean.

While conducting research in different parts of the former Yugoslavia, he tried extremely hard to provide solutions to regional geological problems. Such works were mostly connected with the mapping of individual terrains or with the solving of complex problems from the field of applied geology (mineral deposits, hydrogeology of the karst, engineering geology). His well-known synthetic and theoretical works on the Triassic *Montenegrin* phase of the movement, paleokarstification and the evolution of the holokarst in the Dinarides and the geological position of serpentinite bodies within the Inner Dinarides have produced remarkable and long-lasting results. Additionally, his textbooks and publications on

geological mapping, together with practical work, have provided the foundation for a very good modern. local school for mapping geologists.

Branislav Milovanović was an outstanding pedagogue. He was greatly respected by his students and fellow colleagues for his broad knowledge, huge experience, open-mindedness, brilliant eloquence, and his ability to clearly present even most complex of scientific and technical problems. As a teacher, he constantly endeavoured to develop, promote and expand erudition of young people and his assistants. The making of many post-war generations of geologist in our country has been credited to him.

As a student, while still with the group of 13 Belgrade surrealists, Milovanović published a number of texts expressing his literary ambitions. Having come to University, he chose science over literature but continued to write. At first, those were minor literary features, which later grew into serious articles that popularized geology. In time, he became one of the most prominent local promoters of geology.

Milovanović was a renowned scientist with vivid imagination, refined sensibility, rich poetical style, unusual intellect and independent spirit. His printed papers as well as unpublished essays from the field of geology, numerous highly reputable university textbooks, years of long and very successful career as a Belgrade University lecturer, his devotedness to work at the Institute of Geology and his commitment to assisting the economic development of the country, all make Prof. Milovanović an exceptional individual and one of the advocates of the development of geology in the post-war Serbia.

Branislav Milovanović was a remarkable figure of our public and University life from the 1950s.

Author: *Grubić, Aleksandar*

Dragoslav S. MITRINOVIĆ (1908–1995)

Dragoslav S. Mitrinović was born in Smederevo, Serbia, on June 23, 1908. He completed elementary and secondary education in Priština and Vranje. In 1932 he graduated from the Faculty of Philosophy, University of Belgrade, with a degree in mathematics. Next year, as a student of Prof. Mihailo Petrović-Alas, he defended his doctoral thesis in the field of differential equations entitled *Investigations of an Important Differential Equation of the First Order.*

Until 1946 D. S. Mitrinović worked as a secondary school teacher. He spent some time as a researcher at Paris University where he published about 50 scientific papers, mainly on differential equations.

Mitrinović started his university career in Skoplje, Macedonia, as an associate professor at the Faculty of Philosophy. It took him only five years (1946–1951) to found the Skoplje School of Mathematics, and two mathematical bulletins. He worked effortlessly to help set up a well supplied mathematical library and also facilitated the exchange of foreign scientific publications. His achievements earned him the membership of the Macedonian Academy of Sciences and Arts.

From 1951 to 1978, when he took retirement, Prof. Mitrinović taught at the Faculty of Electrical Engineering, University of Belgrade. In 1953 he was elected the Head of the Mathematics Department. He founded the well known Belgrade School of Functional Equations, Differential Equations and Inequalities. He also started the *Faculty of Electrical Engineering Series: Mathematics and Physics,* which soon became a world famous periodical. Soon after the first faculties were founded in Niš, in 1960, Prof. Mitrinović started another school of mathematics. Between 1965 and 1975 he was the Head of the Mathematics Department at the Faculty of Electronic Engineering, University of Niš.

Prof. Mitrinović was a very sociable person. He corresponded with numerous mathematicians of world repute. He was a longtime member of the American Mathematical Society, Societe Mathematique de France and a co-founder of the Serbian Scientific Society. His social activities also deserve to be mentioned. He was the founder of the Mathematical Information Center of the Serbian Society of Mathematicians and Physicists, President of the Macedonian Society of Mathematicians and Physicists, President of the Federal Mathematics Committee for Coordination of Scientific Research, etc. For a long time, Mitrinović was on the Editorial Board of the Kluwer Academic Publishers for the East European Series *Mathematics and Its Applications*.

Mitrinović wrote a large number of university textbooks and important monographs of high scientific level, published by the world's most renowned publishing houses. His monograph *Analytic Inequalities* (coauthored by P. M. Vasić), published in 1970 by Springer Verlag had a strong impact on the development of this subject in Yugoslavia and abroad.

Mitrinović's work and achievements can be classified into the following areas: differential equations; functional equations; inequalities; complex analysis and special functions. The overall bibliography of Prof. Mitrinović lists 373 works, including 279 scientific papers and 30 other pieces of writing, as well as 17 monographs, 35 textbooks, and 12 other books. Thirty five scientists received their Ph. D. titles under Prof. Mitrinović.

Apart from having written over one hundred papers on differential equations and more than 30 papers on functional equations, he also produced three textbooks on differential equations. His early papers on functional equations from the 1950s were important for the development of the well-known Belgrade School of Functional Equations and for the starting of his *Mathematics Problem Book, Vol. III* (1960). These problems inspired young mathematicians and talented students.

Problems of inequalities were one of Mitrinović's greatest passions in mathematics. He was interested in all kinds of inequalities (elementary inequalities; geometric inequalities; means and inequalities; analytic inequalities; inequalities and extremal problems with polynomials; various particular inequalities; inequalities in number theory). He used to say: *There are no equalities; even in human life one always encounters inequalities.* His interest in inequalities started very early (1959). To each of the mentioned areas of his fascination Mitrinović devoted at least one monograph.

Prof. Dragoslav S. Mitrinović died in Belgrade, on April 2, 1995.

Author: *Milovanović, Gradimir V.*

Milan NEDELJKOVIĆ
(1857–1950)

Milan Nedeljković was born in Belgrade, on September 27, 1857, into a wealthy craftsman family. After finishing elementary school he attended the First Belgrade Grammar School for Boys for six years. He graduated at sixteen and enrolled at Belgrade College. In January 1876 he received his first award for a paper written on physics, and in June he graduated philosophy. At the beginning of the summer of 1879, he won a scholarship from the Ministry of Education and went to Paris, obtaining there the flattering title of the first Serbian astronomer. Before going to Paris, he taught mathematics and physics.

Scholarship terms stipulated that Nedeljković studied physics and astronomy. In order to enroll at the School of Astronomy, he needed a

diploma in mathematics, so he went to the Sorbonne and College de France for two years to study mathematics and physics. The next three years he studied meteorology at the School of Astronomy of the Paris Observatory. The knowledge of precise mechanics, which he acquired at the Gautier Studio, helped him with the instruments and he learned how to personally install them. He returned to Serbia in the autumn of 1884 with a diploma in mathematics, astronomy and meteorology.

In October 1884 he became assistant professor of astronomy and meteorology at Belgrade College, and in 1886 he was elected full time professor. He initiated the setting up of the observatory and a network of meteorological stations. In May 1887 he rented a private house in which he set up a *temporary observatory* and personally covered the maintenance expenses. Observations were made seven times a day, and from September 1, 1888 eight times a day. Helped by his family, Nedeljković made those observations. He managed to supply the meteorological stations with the necessary equipment and continued searching for a suitable building site for the construction of a permanent observatory. The Observatory was finally launched into operation on May 1, 1891 from the new, purpose-built premises.

The system of measurement applied at the Observatory was one of the best known in Europe at the time. Most distinguished world experts praised his system. As early as 1894, readings were taken every hour. Beside a direct method, temperature, pressure and wind readings were taken automatically. The Observatory was the centre of the entire network of meteorological stations. Serbia already had 5 stations by 1889; the following year there were 12 and in 1902 the network comprised of 24 stations. The same year Nedeljković used a special method for measuring the ground temperature, descending 24 meters down into different types of soil (with or without grass cover). He traced the level of variations in temperatures of underground waters. He personally organized and financed the project whereby the area around the Observatory was prepared for agrometeorological and phenological monitoring. The Observatory had about din.12.000 income which was insufficient to purchase the instruments and it could not operate at full capacity, so only for meteorological and seismological monitoring was done.

During World War I, the Observatory was ransacked (except for the library and archives). After four years of hardest bureaucratic struggle, the state allocated Nedeljković funds for the repair work on the Observatory and the purchase of instruments from Germany. He personally covered the costs of his travels to Berlin, Jena, Hamburg and other places which he went to in order to purchase the equipment. The State Committee for War Reparations allocated him about 3 million gold marks. However, he

paid nearly 4,5 million gold marks for the instruments, which clearly shows that he also spent a huge sum of his own money.

He retired in 1924, at the time when the first instruments began to arrive to the Observatory. He was very angry and left the Observatory without visiting it ever after. He died on January 21, 1950.

Thanks to Nedeljković the Meteorological Observatory and the new building of the Astronomical Observatory were fully equipped. A big handmade Zeiss refractor, provided also through him, in terms of its power ranked fourth in Europe at the time. His meteorological manuals were used until World War II. Between the two wars, the Meteorological Observatory was the centre which collected data from across the country and used them for international exchange, too

Author: *Opra, Ljerka*

Dimitrije NEŠIĆ
(1836–1904)

Dimitrije Nešić is rightly regarded as one of Serbia's most renowned educationalists, scientist and cultural activists. He marked, together with Josif Pančić and Đura Daničić, the period of spiritual rise and progress of Serbia in the second half of the 20th century. For a number of years he was Rector of Belgrade College, a full member of the Serbian Learned Society, the Serbian Royal Academy (its president from 1892 to 1895), corresponding member and president of the State Council.

He was born on October 8, 1836 (October 20 according to the Julian calendar) in Belgrade where he completed elementary and six grades of secondary school. In 1853 he enrolled at the Lyceum,

Department of Natural and Technical Sciences, and in 1855 he won a state scholarship to continue studying at the Technical College in Vienna (1855–1858). After that he went to the Karlsruhe Polytechnic. Following the completion of his studies in 1862, Dimitrije Nešić returned to Belgrade. He was elected professor of mathematics at the Lyceum, which became Belgrade College the following year, and worked there until he retired in 1894.

Educated in Belgrade and other progressive scientific and technical centers of Europe of that time, with fresh and broad intellectual and far-reaching concepts and views of the situation in natural sciences, Dimitrije Nešić could recognize new ideas and adopt them. He focused his great talent and enormous energy on the promotion of education in general, and also of technical culture. He laid the foundations of contemporary university teaching of mathematics in Serbia. He was the author of the first textbooks of higher mathematics in the Serbian language (three textbooks altogether) and according to M. Milanković *he considered it his main task*.

Pedagogical activities did not get in the way of his of scientific work. He published eleven works in the *Gazette of the Serbian Learned Society* and the *Voice of the Serbian Royal Academy*, mainly on the subject of mathematical analysis. He was our first mathematician who considered complexity of boundary processes, getting rid of the formality of its application.

Towards the end of the 1870s, he joined a state committee which was considering the conversion of the old measuring system to the metric in the Principality of Serbia. He drafted the *Act on Metric Measures*, which came into force in 1873, 17 months before the *Convention du Metre* was signed in Paris. His book *Metric Measures* was published in 1874. Dimitrije Nešić was decorated with *the Order of St. Sava of the 1st and 2nd Class* and *the Order of White Eagle of the 4th Class*. He was a man of strong principles, noble, caring, refined and good-natured. He died in Belgrade, on April 26, 1904.

Authors: *Petković, Jelenka; Jovanović, Boško*

Djordje P. NEŠIĆ
(1873–1959)

Djordje Nešić was born in Šabac, on June 15 (28), 1873. He completed elementary school in Loznica and high school in Šabac. In 1890 he went to Moscow to study medicine and at the same time attended mathematics and physics classes. He received a sound technical education there which later on stood him in good stead in the construction and development of ophtalmological instruments and aids.

On completing his studies he took an advanced course specializing in ophtalmology at the Eye Clinic in Moscow, headed by the famous Prof. Krjukov. After finishing his specialization course, Nešić returned to Serbia in 1896. He did his compulsory army service soon after which he

joined the Serbian Medical Society in Belgrade, becoming one of its most eminent and prolific members. His presentations were aided by photographs and histopathological preparations, this being a pioneering enterprise at the time. Nešić also displayed ophtalmological instruments and aids of his own make and undertook pioneering experimental ophtalmological projects. His interests included eye surgery, diagnostics and therapy. He kept well abreast of the latest achievements in his profession, following the work of foreign clinics and congresses in the country and abroad. In 1899 he wrote the first textbook on eye diseases for military doctors in Serbia. He took a position at the Eye Ward of the General State Hospital in 1901 and became its Administrator in 1904. He was a volunteer in the 1904-1905 Russo-Japanese war. He devoted great attention to popular health education, wrote numerous articles and booklets, and delivered countless lectures. It is hard to list everything that Nešić did over a quite short period of time. The wars cruelly ended Serbia's speedy progress in many fields. Nešić participated in all the wars waged between 1912 and 1918. He closely cooperated with the military Medical Corps, particularly its Ophtalmological Service which, for a while, he was in charge of. At the Thessaloniki front he was the commanding officer of the Surgical Field Hospital. Amid a severe shortage of supplies, he made various and very useful makeshift instruments and aids.

After demobilization, Nešić returned to Belgrade in 1919, and joined the Eye Ward of the General State Hospital. He worked hard to help the newly established Medical School in Belgrade start working regularly. In 1921 he was appointed full professor at the Faculty and straight away became the Administrator of the newly opened Eye Ward. He equipped the Clinic with modern instruments, apparatuses and teaching aids. Already in 1925 he published a textbook on eye diseases for medical students. The Eye Clinic set professional and scientific work standards to be emulated by others at the Medical School. Numerous physicians pursued their ophtalmological specialization at this Clinic and later opened Eye Treatment Centres in other parts of the country.

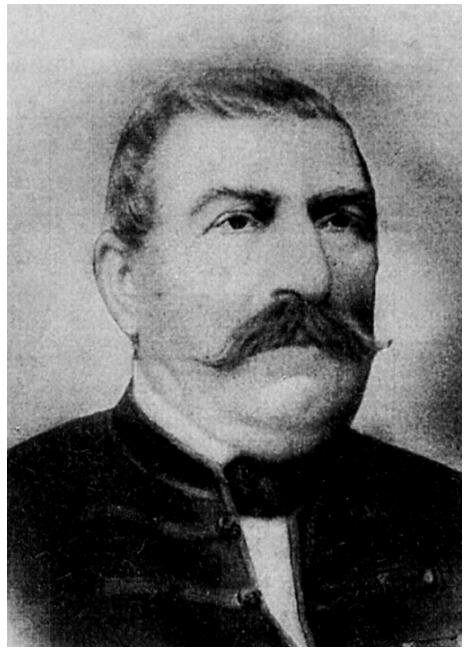
The German bombing of Belgrade on April 6, 1941 severely damaged the Eye Clinic. Nešić and the staff at the Clinic did everything in their power to repair the damage in the shortest time possible. Nešić retired on December 31, 1942. However, immediately after the war ended in 1945, he was offered the position of the Head of the Eye Clinic which he accepted and kept until his final retirement in 1955. Under his administration the Clinic hired a considerable number of new employees. In 1947 Nešić was elected into the Serbian Academy of Sciences. He was an active and committed member practically until the last day of his life. He died in 1959.

Nešić published many professional and scientific papers. He had rich clinical experience and became known in the world for his paper on hemeralopia, the subject he studied thoroughly on diseased soldiers who had been through the Albanian ordeal and who suffered deprivation. He also dedicated a number of his works to the design, construction and application of gigantic electromagnets. He developed models which were applicable to ophtalmology. Many of his works dealt with the diagnosis and treatment of various eye diseases and Nešić also paid great attention to various surgical problems. He was well known for his efforts to control and treat trachoma which he did for almost sixty years. He lived to see the disease eradicated in Serbia. Nearly at the end of his career Nešić, and the eminent Prof. Filatov from Odessa, started using biogenic stimulators for therapeutic purposes. Prof. Dr. Nešić was a pillar of ophtalmological science in Serbia and his students, in recognition for his outstanding achievements, named the Clinic he had founded *Prof. Dr. Djordje Nešić Eye Diseases Clinic*.

Nešić was also well known for his advocacy and popularization of sports in Serbia and was a co-founder of the Cycling and Motoring Clubs in Serbia.

Working tirelessly and enthusiastically, the Academician Djordje Nešić laid the foundations of contemporary ophtalmology. He was a typical intellectual and a gifted writer. Not only was his work pioneering but it can also be described as truly epoch-making. He left an indelible mark on ophtalmology and a lot credit for everything that we have in that area today goes to him.

Author: *Kecmanović, Zlatimir*



Atanasije NIKOLIĆ (1803–1882)

Atanasije Nikolić, a man of many talents, occupies a special place in our culture. He exerted influence on all segments of life in the Principality of Serbia of his time. He was a pioneer of cultural and economic movements in the country. Atanasije Nikolić lived in Austro-Hungary until 1839, before coming to Serbia.

Atanasije Nikolić was born on January 18, 1803 in a village of Brestovac, near Sombor, Bačka district. He finished elementary school in Sombor, started grammar school in Sremski Karlovci but completed it in Novi Sad, in 1819. He graduated philosophy in Đur, Hungary, and also obtained a diploma from the Artillery School in Vienna.

He set up the first school of drawing in Novi Sad, in 1824 after which he completed technical studies in Pest, in 1829, qualifying as a *certified engineer – land surveyor*. He conducted geodetic surveys in Bačka and Banat districts. He worked as an engineer in Bačka district until 1832 without being paid. He also accepted the offer by Petar Čarnojević to be his estate manager. In 1838, the Ministry of Education offered Atanasije Nikolić a position of mathematics teacher at the newly established Lyceum in Kragujevac. He moved to Belgrade in 1839, then to Kragujevac where he was appointed Rector of the Lyceum. In the meantime, he wrote the first two textbooks on mathematics – *Algebra* (1839) and *Geometry* (1841) in Serbian.

When the Lyceum moved to Belgrade, Atanasije Nikolić followed. At the end of the same year, however, he was appointed Head of the Police-Economy Department, which marked the beginning of his agricultural business activities.

Together with Jovan Sterija Popović, A. Nikolić set up the *Society of Serbian Slovesnost* in 1841, and become its full member. In 1864 he became an honorary member of the Serbian Learned Society, and Atanasije Nikolić is justly regarded as the founder of science in Serbia.

Atanasije Nikolić was a great promoter of education in Serbia. He established the first art school, schools for agriculture, and organized and held many training courses. In 1825 he joined Novi Sad theatrical circle. He arranged many folk poems for the stage and personally appeared in some roles. His first drama was *The Shepherd of the Alps*. Nikolić laid the foundations for the first Belgrade theatre, the so-called *Đumruk* Theatre, in 1842. In the course of his twenty-year-long theatrical activities he staged many plays. He also wrote poetry and prose, and collected short folk stories.

Contributions of Atanasije Nikolić to technical and technological development of Serbia were remarkable. He carried out many hydrological and melioration projects, and built dams and embankments. He founded the first textile workshop in Serbia (in Topčider, a Belgrade suburb), in 1853. His name is also mentioned in connection with the casting of the first cannon and setting up of the ammunition workshop. First hard-surface roads were built in Serbia in his time; also a road following the course of the river Morava was constructed and a section of the Belgrade-Constantinople road reconstructed.

He was engaged in military and state affairs, serving as an emissary to Vojvoda Mihajlo Obrenović and carrying messages to the rebels in Vojvodina, and trying to quell the uprisings. Together with Ilija Garašanin he organized the movement for liberation of the Serbs from Bosnia,

Herzegovina, Vojvodina and southern parts of Serbia, and the liberation of the Balkan peoples from the Turkish and Austro-Hungarian dominance.

Nikolić's role in promoting agriculture in Serbia was significant. He organized training courses for peasants, set up the first School of Agriculture in Topčider, started agricultural periodical *Uncle Srećko* (*Srećko* being Serbian equivalent of *Lucky*) first of its kind which published articles with instructions and advise to peasants on how to run their household and work the land. He wrote first books on agriculture: *Field Crops Production* (1854), *Wine Growing* (1854), *Cattle Breeding* (1854) *and Fruit Production and Forestry* (1857). Atanasije Nikolić was fully aware that Serbia's only way out of poverty was to promote and develop agriculture. To achieve this goal, it was essential to change from extensive to intensive type of agricultural production.

Writing opus of Atanasije Nikolić was remarkable. Being a man of broad intellectual horizons he worked and wrote about different areas of culture, and offered fresh ideas of promoting Serbia's science and economy.

Authors: *Sarić, Miloje; Sarić, Zora*

Stevan NIKOLIĆ
(1895–1986)

Stevan Nikolić was born in January 1895, in Nikšić, Montenegro, to a farmer's family. After completing his elementary school in Nikšić, and grammar school in Belgrade as the best pupil in the class, he went to Montpellier, France. There he graduated from the College of Agriculture in 1921 and the following year completed his specialization in the field of agrochemistry at the Institute for Scientific Research in Nice. In 1923 he returned to Belgrade and began his scientific career as an assistant at the Agricultural Research Station at Topčider, near Belgrade. In 1926 he went to teach agrochemistry at Valjevo High School of Agriculture. Stevan Nikolić completed his additional specialization course in agrochemistry in Toulouse, in 1930. He defended his doctoral dissertation under the title

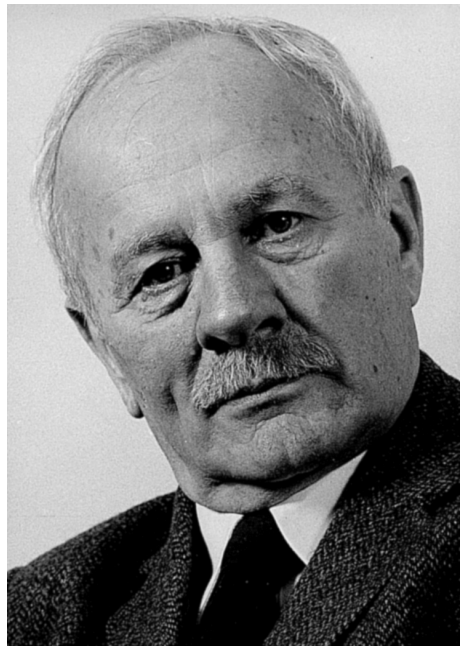
Chemical Study of Acid Soils – the Meliorization. He was awarded a special medal by the Academy of Science for this outstanding paper. In 1931 Stevan Nikolić was elected assistant professor at the Faculty of Agriculture, University of Belgrade, for the subject of agricultural chemistry and plant nutrition. In 1939 he was elected associate professor for the same subject and in 1947 full professor. He retired in 1965.

Prof. Nikolić held many important positions during his professional career; he was Dean of the Faculty of Agriculture, Director of the Institute for Agrochemistry and Plant Physiology, Director of the Institute for Soil Research, and between 1952 and 1954 he was Vice-rector of Belgrade University.

He always supported anyone competent and willing to promote the science of soil and plant nutrition, strongly believing that this would ensure the growth of agricultural production and productivity of the soil itself. He published a number of scientific studies and articles on the subject. Bibliographical data shows that his prime scientific interest was chemical transformation of nitrogen in soil, conditions and the speed of nitrification in different types of soils. By conducting a number of field experiments of almost all important types of soils with different experiment plants, Prof. Nikolić investigated the influence of NPK fertilizers, and the influence of different combination of complex fertilizers on the yield of cultivated plants, thus adding to the study of fertility of soil and application of fertilizers. His study of microelements and their influence on the nutrition of cultivated plants deserves special attention. Prof. Nikolić was the author of four university textbooks that had several reprints. He was mentor to a number of students working on their Ph. D. thesis. He helped them choose the topic of their dissertations, actively followed their study progress, and provided guidance and evaluation of their accomplishment. Prof. Nikolić was an active member of many international organizations. He was president of the International Center for Chemical Fertilizers in Zurich; member of the Scientific Board of the International Association for the Study of Phosphorus in Paris; member of the Executive Board of Engineers and Technicians in Zurich; deputy of the Yugoslav Government to the FAO Commission for Scientific Work in Rome, and was on the Board of Mangers of the International Center for Coordination of Scientific Work in Agriculture, in Rome. For his lifetime achievements, Prof. Nikolić received highest domestic and foreign awards and honours.

The name of Prof. Nikolić will undoubtedly continue to live in the literature and science about soil, and his followers will remember him with respect and gratitude.

Authors: *Pantović, Milutin; Džamić, Ružica*



Gojko NIKOLIŠ
(1911–1995)

Gojko Nikoliš was born on August 11, 1911 in Sjeničak (Croatia) as the youngest child in the seven-member family of Mihajlo, a Serbian Orthodox priest, and Katarina, née Ostojić. He spent his childhood and attended primary school in his birth place. At the end of the summer of 1921, he enrolled at Grammar School in Karlovac. He also went to the renowned Classical Grammar School in Sremski Karlovci and lived at the *Stefaneum* boardinghouse. He completed his secondary education there, successfully passing the final exams. He entered Medical School, University of Belgrade, as an army scholarship holder. As a student he joined progressive political movements. In July 1937 Nikoliš left for

Spain and applied as a volunteer to the Medical Corps Headquarters of the International Brigades. He worked both in hospitals and as a battalion medical officer. He fought in the battle on the Ebro River, gaining his first war experience with the 11th International Brigade Battalions *Ernst Thalmann*, *Hans Beimler* and, later on, *12th February*. He was promoted to the rank of lieutenant of the Spanish Republican Army. After the war, Nikoliš withdrew with the international volunteer corps to France, where he spent 19 months in captivity at various camps (Argeles-sur-Mer, Gurs and Vernet). He returned to Serbia in 1940. Back in Belgrade, he joined the Royal Partisan Detachment on August 9, 1941. He went into action with them as a field medical officer. The Commander-in-Chief requested him to come to Užice. Tito received him on November 20 and promoted him to the post of a medical officer at the Supreme Headquarters. Nikoliš since then participated in all operations conducted by the Main Task Force of the Supreme Headquarters.

The 1st Congress of Partisan Doctors, assembled at his invitation and addressed *to all doctors in the liberated territories of Yugoslavia*, was held in Bosanski Petrovac on September 21–23, 1942. Nikoliš submitted two papers: *The Role of a Doctor in the Yugoslav Liberation Movement* and *Organization Matters of Our Medical Corps.* Based on the latter study he drew up the *Draft of Medical Corps Statute* of the Peoples' Liberation Army and Partisan Units of Yugoslavia, which was endorsed by the Commander-in-Chief on November 10, 1942. Administration of the Medical Corps was thus regulated.

Appointed Head of Medical Service Department at the Supreme Headquarters, he managed the PLA and PUY Medical Corps. During the war Nikoliš started professional gazettes of partisan doctors: *Partisan Medical Corps* (1942); *Medical Bulletin* (1943), and *Medical Corps Journal* (1944). The latter has been continuously published since as *Military Medical and Pharmaceutical Journal of Yugoslavia* with Nikoliš as its Editor-in-Chief until 1953.

Upon the final liberation of the country, he continued his career as the Head of the Medical Service Department at the State Secretariat of National Defence (DSNO) and set out to build a modern medical service. At the end of the 1945, Nikoliš organized a conference of war doctors in Belgrade, which was to summarize most important war experiences.

He initiated the project to establish the Military Medical Academy (VMA). At its formal opening on April 28, 1950, he addressed the public with a speech about the importance of having such an important institution.

Nikoliš also was the founder of the Commission for Medical and Scientific Research (KOMNIS), the only institution at the time in

Yugoslavia which coordinated and financed medical research. He advocated the setting up of the Air Force Medical Institute in Zemun and the Institute of Naval Medicine in Split.

In 1953 Nikoliš was appointed FNRY ambassador to India, but at his own request returned to the country in 1954 to resume the post of the Head of the Medical Service Department at the DSNO. He was president of the Scientific Society for History of Health Culture of Yugoslavia (1966–1968), as well as honorary and life-long president of the International Committee for Military Medicine and Pharmacy (CIMP) in Liege, Belgium.

He was elected a corresponding member of the Serbian Academy of Sciences and Arts (Department of Medical Sciences), and on May 28, 1970 he gave his inaugural lecture entitled *Military Medicine.* The same year Nikoliš was appointed professor of Medical Corps Organization and Tactics at the Military Medical Academy. After thirty years of being the Head of the Medical Corps (1941–1971) and holding the rank of Lieutenant General, he retired at the end of December 1971. On November 16, 1978, being elected a full member of the Serbian Academy of Sciences and Arts, he gave the inaugural lecture *Man between Hope and Imperilment of Modern Medicine.* He was appointed member of the Yugoslav Academy of Sciences and Arts in Zagreb on February 9, 1983.

Nikoliš's scientific work was dedicated to the problems of medical corps organization and tactics and the unique wartime medical doctrine; general military medicine; historiography of Peoples' Liberation War; army science and scientific research. The bibliography of Gojko Nikoliš lists 141 papers and eight monographs:

The Current Problems of Our Medical Service. The author summed up all his previous experience, including mistakes and errors, suggested guide-lines for further activities of the medical corps and analyzed their specific features.

The Development of Our Army Medical Corps. This very important study, the first of the kind in our medical historiography and based on the author's personal experience and observation, was written in order to prompt war veterans to collect documents relevant for the history of our medical corps.

Defence by Small Means. In this original study, Nikoliš explicated how limited resources can successfully be used to fight the aggressor.

Sava Mrkalj – The Story of a Loser. A fictional biography of a gifted but unhappy linguist, an important reformer of the Cyrillic alphabet and a predecessor of Vuk Karadžić, who was born 128 years before Gojko Nikoliš in the same village of Sjeničak.

Memoirs – Root, Trunk, Creeper. Nikoliš boldly chose his motto: *I have never tried to be impartial.* The memoirs reveal his sense of delicate, profound observation of history, his literary culture, perseverance and the strength of his convictions. The book was awarded the NIN Prize *Dimitrije Tucović* in 1980.

The Spanish Dawns. This book about the Spanish Liberation War and the months of his internment in French camps was dedicated to a jubilee commemorating the foundation of the Spanish War International Brigades.

Records under Pressure. These records disclose a stylistic consistency as well as the author's originality and capability of assessing historical events with the amount of objectivity and criticism that only could procure the trustworthiness of evidence.

On Death. In the process of dying, life and death walk hand in hand, intimately interwoven, competing with each other and struggling, but without a shade of doubt as to which one is to lose the battle.

Until September 1992 Nikoliš was a very active member of the Serbian Academy of Sciences and Arts, both on its committees and acting as its representative at numerous scientific conferences in the country and abroad.

Gojko Nikoliš left Belgrade for France on September 17, 1992. He lived in La Ferte Bernard, his health already declining. He died at the age of 84 on July 10, 1995 and was cremated in Le Mans the following day. His urn was brought to Belgrade.

Author: *Gavrilović, Vera*

Nikola M. OBRADOVIĆ
(1900–1982)

Nikola Obradović was born in Belgrade, on 15 May 1900. His father, Milan, served with the Ministry of Commerce, while his mother, Božana, looked after a rather large family (two daughters and three sons). Nikola inherited Polish and Czech blood from her (Božana's parents came to Serbia from Lemberg, Austria, during the 1880s).

Nikola joined the Serbian army in World War I and suffered the hardships of withdrawal through Albania in 1915. With other boys of his age he was sent to a college in France. He completed his education in Beaulieu, Nice, and passed the final exams as one of the best pupils. In April 1919 Obradović left France and rejoined his family in Belgrade

where he enrolled at the Technical Faculty. He graduated in 1924 and, after 9 months of national service, he became an assistant at Belgrade University. His mentor was Prof. Vladimir Farmakovski, a Russian immigrant and a well-known engineering expert. On his advice, Nikola Obradović went to Germany in 1929. He studied advanced fluid mechanics and hydraulic machinery at some of the country's most prestigious institutes for two years.

Back at Belgrade University, Nikola Obradović became lecturer for the subject of hydraulic machines (1931). He presented the knowledge obtained in Germany in his lectures on fluid mechanics (1933) and wrote his first textbook *Basics of Fluids* (1937). He taught basics of aerodynamics at the new course on aircrafts. At the same time he worked in the hydraulic machinery industry which was budding in Serbia, designing the first Kaplan turbine, as well as several Francis turbines and pumps for a private company in Niš. He also helped set up a library at the Technical Faculty and worked hard to create a modern laboratory for pumps and turbines.

World War II interrupted Obradović's career. He joined the Yugoslav Army but soon became a prisoner-of-war in Germany. Released nine months later, he returned home. There were no lectures for students, but the University was officially open so Nikola conducted some study work. He became a full professor in 1943. In 1945 he was dismissed by the new government and had to look for another job. Fortunately, in the postwar years, plans to develop Yugoslavia's hydro potentials were made and Obradović was appointed consultant-engineer by the Ministry of Energy Supply and Industry. He participated in the planning, design, construction and test-runs of several hydro power plants built after the war, such as *Ovčar banja* and *Đerdap*. Under his wing many young engineers developed into well-known experts on hydro power plants in Yugoslavia and abroad.

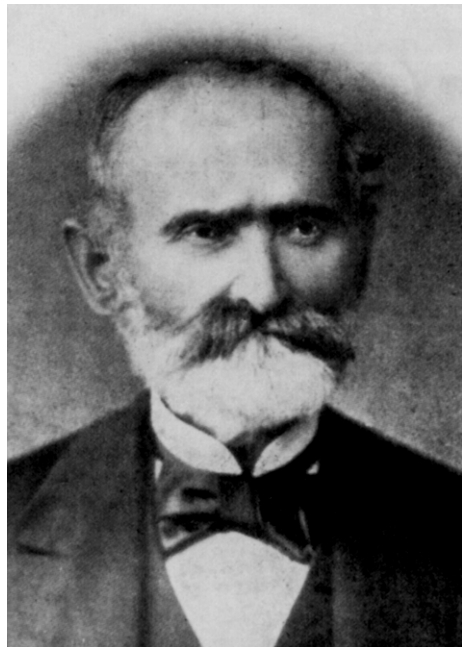
Nikola Obradović resumed teaching at the University in 1949, as a hydraulic machines professor. He continued the work on the laboratory for hydraulic machines – interrupted by the war – and in 1955 it became fully operational, with the newest facilities and equipment. Several generations of hydraulic engineers used it for studying, and research purposes. Nikola Obradović produced several textbooks on fluid mechanics, turbo-compressors and turbo-machinery, majority being the first one written in the Serbian language. These books are still being used by students and engineers. He did not neglect the industry and was a very active consultant on many projects- especially during the construction of the huge Đerdap system on the Danube (he was decorated by the Romanian go-

vernment for his contribution). He also designed a small turbine used in electrification of villages. His abilities and energy were well-known, and he was instrumental in the establishing the department of hydraulic machinery at the newly founded Universities in Sarajevo, Niš and Novi Sad. He taught there even after retirement in 1970.

Nikola Obradović became a correspondent member of the Serbian Academy of Sciences and Arts in 1961 and its full member in 1972. He was a member of several SANU boards and committees for the development of the country's hydro potentials and the compiling of a technical dictionary.

Nikola Obradović died in 1982. His students, future colleagues, remember him as a great professor, excellent teacher and a loyal associate. He was famous for giving free advice and help. His achievements in various fields, from fluid mechanics to practical engineering, are remarkable and he left behind a number of first-rate books which are still widely used. He was a man of broad knowledge who spoke several languages (French, German, English, Italian, and Czech) and always kept abreast of the latest inventions. He wrote superbly and vividly, and did not tolerate poor knowledge of Serbian in others. Nikola Obradović had a fine sense of humour, was quick-witted and very popular with students – his lectures were always well attended. Never satisfied with his achievements, he used to say that he never delivered the same lecture twice.

Authors: *Obradović, Dušan; Benišek, Miroslav*



Josif PANČIĆ
(1814–1888)

Josif (Josip) Pančić was born on April 17, 1814, in the village of Ugrine near Bribir on the Croatian Coast. Pančić finished elementary and secondary education at Gospić and Rijeka before enrolling at Zagreb College, in 1830.

Having developed interested in natural sciences at an early age, especially botany and zoology, which at the time were linked with the study of medicine, Pančić continued his education at Medical School in Budapest in 1832. There he became extremely well acquainted with fundamental disciplines of natural sciences - studies of flora, fauna, and the systematics and taxonomy of plants and animals, and in 1842 he earned

his Ph.D. in medical sciences defending the dissertation on the systematics and taxonomy of plants entitled *Taxilogia botanica.*

In May of 1846, Josif Pančić moved to Serbia where he practiced as a physician in Jagodina and Kragujevac until 1853. Apart from practicing medicine, he explored his new surroundings and studied the plant and animal world, geological phenomena, and mineral and medicinal springs and spas.

In 1853 Pančić was appointed professor at the newly founded Department of Natural History and Agronomy of Belgrade College. He was to teach all natural science subjects: botany, zoology, mineralogy, geology and agronomy. For a short time he also taught meteorology and physical geography. Pančić's research activities covered the entire range of subjects which he taught. Botany was his favourite, followed by zoology and geology, where Pančić achieved significant results and laid the foundations for organized research in the natural sciences in Belgrade.

He wrote and published 42 research essays in the Serbian, German and Latin languages: 28 on the subject of botany (plant taxonomy and systematics), six in the field of zoology, and four on geology. The rest were popular natural science articles for general public. Sixteen works can be categorized as monographs in terms of length, scientific approach and contribution to science. These monographs applied scholarly principles accepted by the European school of natural sciences at that time. Special mention should be given to *The Flora of the Principality of Serbia* (1874) and *Supplement* published in 1884, in which 2,422 vascular plant species are described, and to *Elenchus Plantarum Vascularium Quae Aestate A. 1873 in Crna Gora Dr. J. Pančić,* describing 1,298 plant species native to Montenegro. In the monograph *Material for the Flora of the Principality of Bulgaria* (1883), followed by *New Material* in 1886, Pančić presented studies of 1,376 plant species growing in the territory of neighbouring Bulgaria. In *Eine Neue Conifere in der Oestlichen Alpen* (1876) and *The Omorica – New Species of Conifer in Serbia* (1883), Pančić informed the world about his great scientific discovery in Serbia of the relict endemic evergreen woody plant species which he named *Picea omorika (Pančić) Purk.*

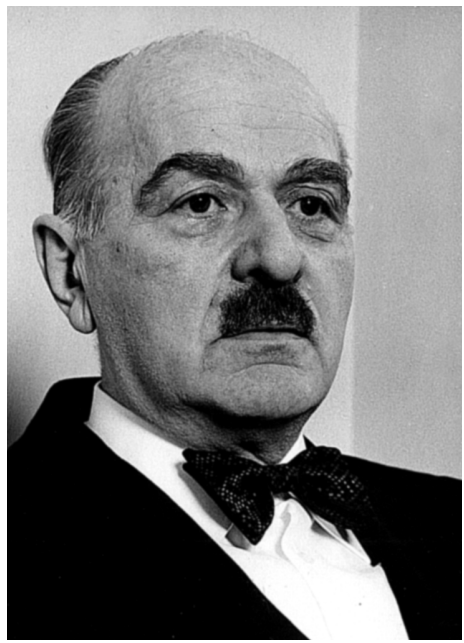
In the course of his successful forty-year-long career of studying the plant world in Serbia and neighbouring countries, Josif Pančić made an exceptional scientific contribution by discovering 121 new plant species, 50 new plant varieties, and seven new plant forms. Of the 121 new species noted by Josif Pančić, 46 have remained systematized as such in all modern-day textbooks on flora.

Pančić's monographs on zoology are still important works. Of special note are *Fish in Serbia* (1860), *Birds in Serbia* (1867), and *Orthoptera in Serbia* (1883). He prepared three textbooks for his students: *Zoology* (1864), *Mineralogy and Geology* (1866), and *Botany* (1868). He included in these textbooks the findings from his own research carried out in Serbia. An advocate of audio-visual aids in the teaching of the natural sciences, Pančić set up the natural sciences laboratory with extensive collections, and founded Belgrade's first Botanical Garden.

Josif Pančić was president of the Belgrade College for six terms, in addition to his public service activities in the highest state institutions. When the Serbian Royal Academy was founded on November 1, 1886 Josif Pančić was named its first president.

Josif Pančić died in Belgrade, on March 8, 1888.

Author: *Diklić, Nikola*



Izidor PAPO
(1913–1996)

During the second half of the 20 century, the charismatic Prof. Izidor Papo was not only the Head of the Surgical Department of the Army Medical Academy but also the chief surgeon with the rank of general-colonel of the medical service and an esteemed member of the Serbian Academy of Sciences and Arts, with a great number of national and international honours. He was born to an office worker's family of Sephardi Jews and his meticulousness and extraordinary intelligence became obvious very early on in his life. He completed his entire education, including medical studies, with above average grades, in 1937. However, anti-Jewish pogrom interrupted his surgical specialization in

1941 when almost his entire family was wiped out, as a result of which he joined a Mostar partisan battalion from where he was soon relocated to a surgical team within the Supreme Headquarters of the National Liberation Army of Yugoslavia. Having gained prominence as a surgeon, he was sent to the Allies' Surgical Centre in Bari, Italy, to expand his knowledge and broaden his experience. With the arrival of a Soviet medical mission to the Centre, he met his future wife. She was assigned to him as an instrument nurse, in a Yugoslav Army field hospital, during the final war operations on the territory of Yugoslavia. After the war, he went to Moscow and Leningrad for additional training. Dr Papo stayed there from 1946 to 1948, learning surgical procedures and techniques for antethoracic oesophageal reconstruction with the use of the jejunum (small intestine). Upon returning to the country, in 1948, he was appointed Head of the Second Surgical Department of the Main Military Hospital in Belgrade. In 1950 he was elected assistant professors, in 1953 he became associate professors and in 1956 full professors of surgery as well as the Head of the Surgical Department and the chief surgeon of the Yugoslav Army.

As early as 1954, published were the results of 100 successfully performed operations, carried out at the Army Medical Academy, on patients with corrosive damage to the oesophagus, in which a piece of the jejunum was used to connect the remaining part of the oesophagus on the neck, this time with improved modification. Poor implications at times of feeding of the patients prompted Prof. Papo to directly connect the remaining segment of the oesophagus on the neck to the jejunum which was placed subcutaneously under the thorax, instead of connecting the two latero-laterally. During the next step of the procedure, the damaged oesophagus becomes completely removed. In cases when the subcutaneous curvature of the jejunum fails to reach the neck oesophagostomy with the use of local skin flaps, jcjuno-dermato-esophagosplasty is applied to join the jejunostomy to the oesophagostomy. Operable tumours in the lower, third segment of the oesophagus were treated inside the thorax by connecting the incised oesophagus to the partially mobilised abdomen.

Prof. Papo zealously followed the affairs of the war. Using the magical intuition of an experienced war-time surgeon, he decided to explore the ways the war wounds, caused by missiles of great initial speed, were treated. The research matched the latest developments of the science and military technology, resulting in the creation of a new approach to treating this type of wounds. This basically implied a two-

stage procedure whereby a wound is treated primarily, that is upon being inflicted, and then 5–10 days later, which is when it closes with a delay because of a deferred effect of the *shock wave* sent to the distant microstructures of the tissue.

During study travels to a number of clinical centres in the USA, in 1950, Prof. Papo familiarized himself with scientific and technological achievements in the field of diagnostics and also learned about inconceivable opportunities for treatment in humane medicine. After returning to Yugoslavia in 1951, first operations on the closed heart were performed on patients with congenital as well as acquired heart conditions. Preparations also began for the treatment of heart diseases, both on the arrested as well as the open heart, by using extracorporal circulation and hypothermia. The goal was achieved at the Army Medical Academy, as early as 1960. Some congenital heart deficiencies in children were treated first, and were followed by treatments of congenital heart diseases in adults, in 1965. For some time the method of immersion hypothermia, according to H. Swan, proved satisfactory in the treatment of minor defects on the atrio-ventricular valve of the heart in smaller children.

In 1961, Prof. Papo became an associate member of the Serbian Academy of Sciences and Arts and its full member in 1968. He was promoted to the rank of general-colonel of the medical service in 1975 and in 1979 became a full-fledged member of the Federal Council of the Socialist Federal Republic of Yugoslavia. He was a member of numerous medical associations, such as the American Association of Cardiologists, International Association of Hydatology, honorary member of the American Association of Army Doctors, International Surgical Association, honorary member of the Royal College of Surgery of England and Ireland, British Association of Chest Surgeons, honorary member of the Surgical Academy in Paris, associate member of the Academy of Sciences and Arts in Sarajevo, associate member of the Yugoslav Academy of Sciences and Arts in Zagreb, and many more. He was the recipient of a large number of awards and military decorations among which were *the Vyshnievski Medal of the city of Moscow, the AVNOJ Award*, *the ZAVNOBIH Award*, *the 22nd December Award of the Yugoslav National Army, the City of Belgrade October Award*, *the 7th July Award*, *the City of Mostar Award* and honorary membership of Mostar University. He was also awarded numerous military decorations such as *the Knight of the British Empire, the Medal of the Yugoslav Flag with the Golden Wreath, the Medal of the Yugoslav Star with a Wreath,*

the Medal of the Partisan Star of the 1st Order, the 1941Partisan Medal, and many more. He actively lectured both at home and abroad, primarily on the subject of cardiovascular surgery and reconstructive surgery of the oesophagus.

He died on October 14th, 1996 at the age of 83, and was buried at the Jewish cemetery in Belgrade.

Author: *Jablanov, Jovan*

Petar S. PAVLOVIĆ (1864–1938)

Petar Pavlović (Požarevac, 1864 – Belgrade, 1938), a high school teacher, scientist, founder and director of Natural History Museum, member of the Serbian Royal Academy, was one of the most outstanding personalities in the history of geology and zoology at the time scientific institutions in Serbia were emerging.

Petar Pavlović obtained his diploma in 1886, from the Natural and Mathematical Sciences Department of the Faculty of Philosophy, Belgrade College, as one of the first followers of J. Žujović with whom he continued a close collaboration. His first teaching appointment was at Zaječar High School (1887), before he moved to Belgrade in 1889, to

teach natural sciences at the College. In those days it was not unusual for a high school teacher to engage in serious research work. Pavlović did his postgraduate studies at Vienna University where in 1893–1894 he atten-ded lectures in geology and paleontology held by Professors E. Suess and W. Waagen. At the same time he worked with Th. Fuchs at the geological-paleontological section of the Vienna Natural History Museum, studying Tertiary fauna from Serbia. Then he moved to Zagreb, to the National Zoological Museum where he attended lectures of the famous Yugoslav malacologist, Prof. S. Brusina, during 1894–1895 and studied Tertiary molluscs. Brusina left a deep impression on his student Petar Pavlović.

Pavlović then returned to Belgrade College, where he campaigned for the setting up a natural history museum. In 1901 he was appointed first director of the Serbian Land Museum, keeping the position until he retired, which he did at his own request in 1926, at the age of 62. The Museum was the life-time achievement of Petar Pavlović and he was quite aware of his historical role in the founding of such an important scientific and cultural institution.

It is difficult to single out his most important achievement. His greatest involvements were in the fields of paleontology, stratigraphy and geology, while elsewhere his contributions, although somewhat smaller but pioneering by nature, were equally significant. He is most frequently referred to as our *third geologist* (after Žujović and Radovanović). Yet, one of his activities deserves a special mention, being a result of not only his intellectual capacity for integral scientific perception but also of the fact that he headed the Serbian Land Museum for a long time. Pavlović was one of the first modern *general naturalists* (having compiled, in 1920, the first comprehensive historical survey of the naturalist profession in Serbia with a bibliography).

Although he belonged to the *Žujović group* of modern geology enthusiasts, Pavlović was an independent and authentic scientist, professional and educationalist. He devoted himself to pioneering research of fossil and recent fauna, and thanks to his amazing gift of observation he could describe a large number of taxa that were new to science. He enriched paleontological fauna of Serbia with three new marine types of foraminiferans, 57 types of molluscs from the Pannonian Sea and 87 freshwater lake types of molluscs, mostly of the low Pliocene and the middle Miocene age. There were also dozens of new taxa of recent snails. He encouraged the early attempts at ornithological and ichthyological research in Serbia.

Petar Pavlović possessed amazing energy, as the volume of his opus best proves. At the same time, he was a curious and controversial combination of austere and bohemian personalities. His self-effacing modesty was best expressed in 1890, in the preface to his earliest work, and he maintained his poise even when being presented with the highest honours.

Authors: *Pantić, Nikola; Vasić, Vojislav*

Stojan I. PAVLOVIĆ
(1903–1981)

Stojan Pavlović, (Belgrade, June 14, 1903 – September 12, 1981) academician, full professor of Belgrade University, follower of the number of outstanding persons of the Serbian geology, modernized mineralogy and petrography by introducing series of new methods that he had studied during the nine years spent at the Laboratory with Prof. A. Lacroix in Paris.

He completed his education at the First Belgrade Grammar School for Boys where he passed his final examination in 1922. He enrolled at the Faculty of Philosophy in Belgrade, to study mineralgeology. He graduated in 1926 and was awarded a scholarship by the French Ministry of Education. He went to Paris and did his specialist studies there between

1927 and 1929. From 1931 to 1935, he was an assistant to Prof. A. Lacroix. In 1935 he was put in charge of practical experiments at the mineralogical laboratory of the Museum of Natural Sciences in Paris. In 1936 he defended, and in 1937 published, his doctoral dissertation entitled *Les roches eruptives de Zlatibor (Yougoslavie) et leurs relations avec les formations crustallophyliennes et sedimentaires environnantes* under the mentoring of Prof. A. Lacroix.

After returning from France, Pavlović worked as part time professor of mineralogy and petrography at the Belgrade Technical Faculty, the Mining Department. He was also an assistant at the Geological Institute of the Kingdom of Yugoslavia from 1937 to 1939. He was elected assistant professor of mineralogy at the Institute of Mineralogy and Petrography of the Faculty of Philosophy in 1939, and associate professor at the Faculty of Natural Sciences and Mathematics in 1948, which was already an independent faculty. He was elected full professor at the Faculty of Natural Sciences and Mathematics in 1950, and later on also at the Faculty of Mining and Geology. He retired in 1972.

After the war, Pavlović was the Head of Mineralogy and Petrography Institute of the Faculty of Philosophy. He was elected Head of Mineralogy and Petrography at the faculty of Natural Sciences and Mathematics; Head of the Department of Mineralogy and Crystallography of the Faculty of Mining and Geology. He was also Dean of the Faculty of Natural Sciences and Mathematics for two years in a row, during the academic 1954/55 and 1955/56 years. As a member, vice-president or president of many societies, committees and associations of mineralogy and petrology sciences he represented our achievements to the world scientific community.

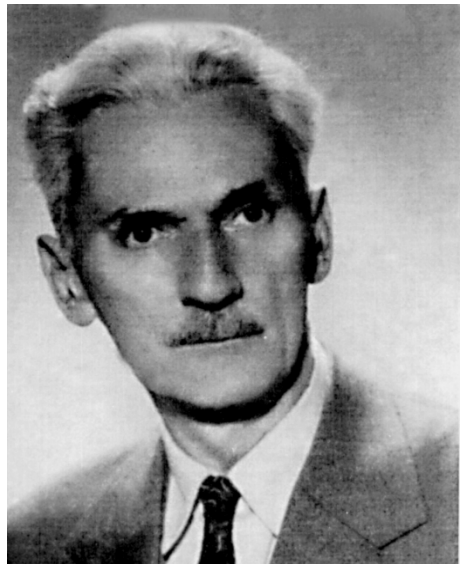
Pavlović was elected corresponding member of the Serbian Academy of Sciences and Arts in 1948, full member in 1955. He continually investigated and classified minerals, ores and rocks, and published his findings in the Academy's bulletins and foreign periodicals. He was elected corresponding member of the Yugoslav Academy of Sciences and Arts in Zagreb, in 1965 and was promoted honorary doctor of geological sciences by the Komensky University in Bratislava, 1969.

Stojan Pavlović was the recipient of many honours and decorations: *the Order of Labour of the 1st Class*, 1956; *the Federal Committee for Nuclear Energy Award*, 1963; *the 7th July Award*, 1974.

Scientific opus of Prof. Pavlović deals mostly with the study of manganeous minerals, ore minerals in a reflected light, asbestos, neoserpentine minerals, and a number of non-metallic minerals and granitoide and ultrabasic rocks. He also researched nuclear mineral resources, especially uranium.

The value of his scientific and pedagogical works is most apparent in the fact that thanks to him new disciplines (crystallography, geochemistry, petrology of sedimentary rocks, mineralogy of synthetic products and industrial minerals) at now being taught at Belgrade University.

Author: *Obradović, Jelena*



Miladin M. PEĆINAR
(1893–1973)

Academician, Prof. Miladin M. Pećinar was born on 18 March 1893, in a small village of Ljubiš on mount Zlatibor. He finished primary school in Ljubiš in 1904. In 1912 he completed secondary school in Užice. In autumn 1912, with the start of the Balkan Wars, he registered with the Civil Engineering Department of Technical Faculty in Beograd. His studies were interrupted between 1912 and 1918, during the Balkan Wars and World War I. In those days he was mobilized into students' battalion in Skopje known as *the Battalion of 1300 Corporals*. In 1915 he fought in the Kolubara battle and witnessed Serbia's victory over the Austro-Hungarian Empire. Later on, when the Austro-Hungarian and

German armies attacked Serbia for the third time, Miladin M. Pećinar retreated with the others, on foot, across Albania, to Corfu. He was wounded on the Thessaloniki Front in 1916.

Eventually, in 1921, he finished his studies at the Civil Engineering Department of Technical Faculty in Belgrade, and received a diploma of a civil engineer.

As an engineer, he dealt with all aspects of hydrotechnics, and covered almost all branches and scientific disciplines of hydrotechnics: hydrology with hydraulics, water power engineering, and erosion of terrain, water supply, sanitary engineering, mineral water supply and hydrotechnical structures, achieving considerable results in all of them.

He was a full member of the Serbian Academy of Sciences and Arts.

Whilst working at the Faculty of Civil Engineering, he unselfishly conveyed his knowledge to his students. He contributed greatly to the development of hydrotechnics and the quality of education and as an engineer he was unreservedly focused on hydrotechnics. He approached and treated all problems hydromechanics and hydrology as unique and complex and thus became a recognized authority on various hydrotechnics-related subjects. Lately these acquired a status of specialist subjects of hydrotechnics.

Among many of the hydrotechnical projects carried out according to his design, the dam on the river Treska is perhaps the most important one. Although a small construction, the dam had all the components of a large-sized one. It was of a *Penja Bef* type and the second such dam constructed in Europe at the time.

Pećinar's project for the development of a water-supply system in Belgrade also deserves a mention because it represents probably the most important project of the kind in our country. His proposal to supply water to the city through a system of tunnels, a very rational way of doing it, was very effectual.

Zemun sewage system, built according to his design, certainly represents one of the most complex projects of this kind. Poor characteristics of the town's low underground layers presented particular difficulty.

The problem of accumulation and exploitation of mineral water was very successfully resolved particularly in cases of Niš Spa (Niška banja), Bukovik Spa (Bukovička Banja) and the spring of Palanka.

Pećinar's creativity is based on the understanding of fundamental principles of all the disciplines that are necessary for the solution of hydrotechnical problems. Intuition is an equally important component and also necessary in research work where optimum solutions are sought after.

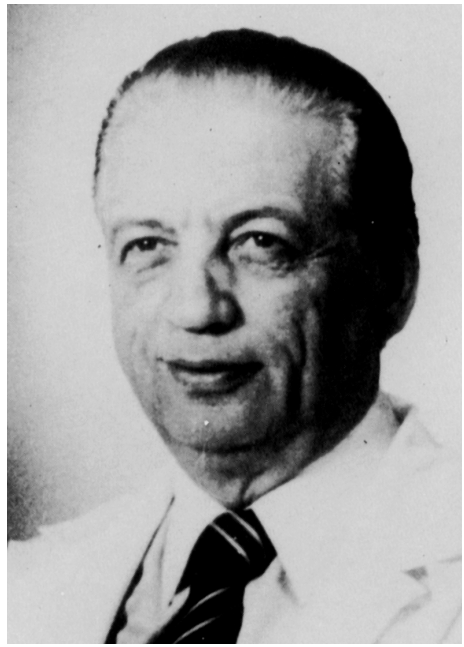
Vital in this work is also a good selection and appropriate utilization of the best parameters on which the optimum solution can be based. Delivering creative engineering solutions in such a way is not only scientific but is also accurate, and academician Miladin M. Pećinar always adhered to it.

His professional success as an engineer, a university lecturer, and an adviser in various institutions brought this country a good name. Academician Miladin M. Pećinar was one of the most important pioneers of modern hydrotechnics not only in Serbia but in many other parts of the former Yugoslavia. He was also well known abroad where many Yugoslav engineers worked on important hydrotechnical projects.

Miladin M. Pećinar was the recipient of *the Order of the White Eagle with the Swords* for his services in the Serbian Army during World War I, and *the Albanian Memorial Medal.* In 1930 the Serbian Orthodox Church awarded him *the Order of Saint Sava.* He was decorated for his scientific and engineering achievements in hydrotechnics, in 1938, with *the Yugoslav Crown Order* and after World War II he received a few more medals: *the Medal of Labour* and *the Medal for Merits with the Golden Wreath,* as well as two *City of Belgrade October Awards,* two *7th July Awards* and *the AVNOJ Award.*

He died in Belgrade, on June the 5th 1973 and was buried in Ljubiš, the place of his birth.

Authors: *Petrović, Petar; Melentijević, Mirko*



Sava PETKOVIĆ
(1910–1992)

Sava Petković was born in Niš, on September 24, 1910 into a renowned family of physicians. He completed his secondary education in Belgrade, where he also graduated from University School of Medicine. In 1940 he received a diploma in urology and in 1942 in general surgery. He spent some time in Paris, undergoing advanced training, and in 1938 he was elected visiting assistant. At the time he worked with the famous French Professors Marion and Chevassu. His urological mentor was Prof. Leon Kojen (1876–1949) who was the Head of the Urology Clinic, founded in 1931, and the Second Surgical Department of the State General Hospital in Belgrade. Prof. Kojen was the first educated urologist in

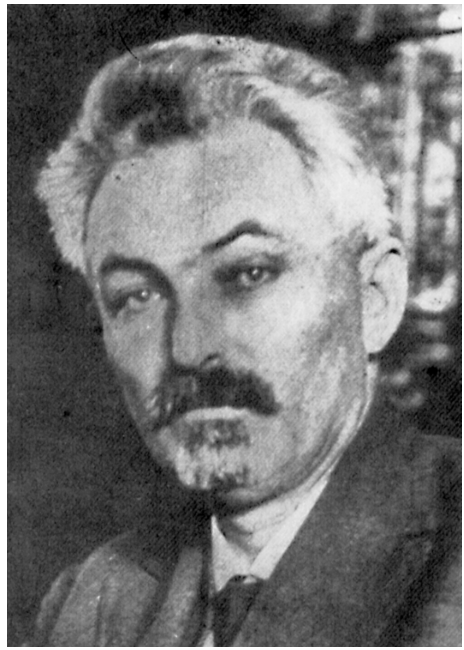
Serbia and Yugoslavia. At the end of World War II, Sava Petković assisted Prof. Kojen with treating the wounded soldiers from the Srem Front thus expending his knowledge and practical experience regarding the treatment of war-inflected injuries of the urogenital organs.

In 1949 he was elected assistant professor at Medical School in Belgrade and in 1951 he was appointed Director of the newly founded Clinic of Urology in Belgrade at which he stayed until he retired in 1978. Sava Petković was a great physician, an exceptional educator and lecturer. He quickly adopted new surgical techniques from leading centers and applied them at the clinic. In 1968 he was elected corresponding member of the Serbian Academy of Sciences and Arts and on April 22, he became full member. He is remembered, by his fellow-members at the Academy, as an extremely dynamic and creative individual, always striving for the best solutions.

The focus of his research was tumour of the renal pelvis and ureters in the areas affected by endemic nephropathy, and he also worked on classifications of renal tumors, tuberculosis of the urogenital system, acute renal failure, tuberculosis of the urogenital system, acute renal failure, and calculosis of the urinary system and injuries of the urogenital system. His references include 410 papers and 6 books. Sava Petković is rightly considered the founder of modern school of urology in Serbia and Yugoslavia, and one of the most renowned surgeons in our country. He was particularly famous for his prolific and original scientific publications and was succeeded by numerous followers who became remarkable urologists.

Sava Petković died after a long and grave illness (diabetes mellitus and Parkinsonism) on October 26, 1992 at the Clinic of Urology in Belgrade. During his long hospitalization he was nursed and looked after by his students. He was buried at the Ćićevac cemetery church, his foundation.

Author: *Hadži-Djokić, Jovan*



Vladimir K. PETKOVIĆ (1873–1935)

The name of Vladimir Petković appeared in our and European geology at the turn of the 20th century. Supporter and coworker of the first Serbian geologists Jovan Žujović, Jovan Cvijić, Svetolik Radovanović and Sava Urošević, Petković joined the best Serbian geologists with his explorations and studies of regional geology, tectonics and stratigraphy.

He was born on June 19, 1873 in Boljevac, Eastern Serbia. He finished Grammar School in Zaječar, in 1892, and went to study geology at the Faculty of Philosophy in Belgrade, in 1896. Upon graduation, he worked at Grammar School until he was appointed assistant professor at Belgrade University, in 1905. He received his Ph.D. title in 1908. He left

University during the 1912–1918 war years. However, in 1920 he was elected full time professor. He taught young generations and did a lot of research work throughout his life, until he died in 1935.

He was elected Dean of the Faculty for three terms; University Rector in 1932/33; Secretary of the Natural Sciences and Mathematics Department of the Serbian Academy of Sciences; and president of the Geological Committee of the Kingdom of Yugoslavia.

In 1921 he was elected corresponding member of the Serbian Academy of Sciences and full member in 1930. He was a member of many geological and geographical associations at home and abroad as well as a member of foreign academies of sciences. He was a co-founder of the Carpathian-Balkan Association. As the Head of the Department of Geological Maps of the Geological Committee of the Kingdom of Yugoslavia, Petković organized and participated in the systematic drawing of country's geological maps. He published over 70 works. The subject of his doctoral dissertation was Mount Tupužnica (1908). He wrote monographs and the first textbook on history of geology (1925).

Upon graduation in 1896, Petković frequently changed jobs. He first worked as a clark at the Serbian Academy of Sciences, then as an assistant lecturer at grammar schools in Negotin, Skopje, Thessaloniki and Kragujevac. In 1905 he was elected professor at University. Since the outbreak of the Balkan Wars in 1912, Vladimir Petković actively worked not only on the theoretical aspects of science but also on its application. He explored and studied terrains of Serbia's eastern regions. His highly recognized work on the *Gault of Serbia* was published in 1913, at the time he was already entrusted with a special task by the Serbian Army.

Petković fought in the 1912–1918 Balkan Wars and World War I, during which time his scientific and research activities were put on hold. He was a courier in the army and also an education coordinator in the liberated parts in Southern Serbia. He was appointed Minister of Education even before World War I ended, and he kept the post until 1920. The same year, he was elected full professor. This period in his career was the most creative one. He achieved great results in educational practice, scientific work, field studies; he established and was in charge of geological associations and institutions at home and abroad; organized systematic drawing of geological maps of Yugoslavia. There existed close cooperation with many universities, academies, geological and other professional associations for which he received many awards.

Most of his works were written during this period: *Beremian Stage in the Greben Area* (1921); *On Layers with Belemnitella Mucronata Schlot. sp. in Eastern Serbia and their Significance for the Paleography*

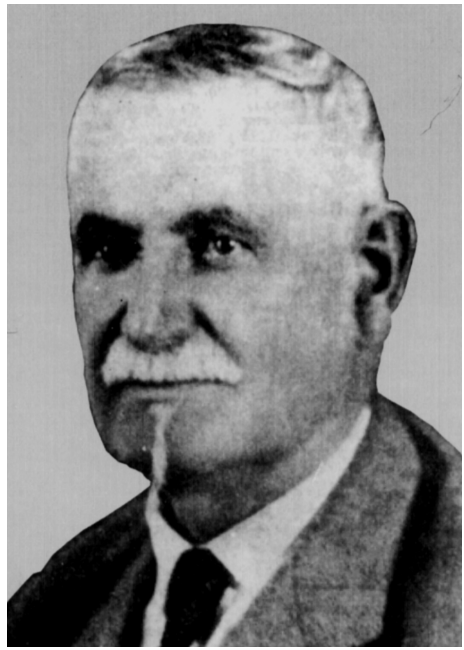
of North-Eastern Part of the Balkan Peninsula (1922). Petković also produced a piece of writing which dealt with the development of coal mining entitled *Stratigraphic and Tectonic Relation in the Area of Mount Rtanj* (1922), and one especially important piece entitled *Tectonic Structure of Eastern Serbia* which earned him full membership into the Serbian Academy of Sciences.

In 1931 Petković published *Geological Composition and Tectonic Position of South-Western Part of the Timok Basin,* compiling results of previous study and terrain research works of Eastern parts of Serbia (coal mining area of Mount Tresibaba).

The last years of his life were afflicted with illness, financial problems and his overwhelming desire to finish his work *Geology of Eastern Serbia*, the synthesis of almost thirty years of work and study of the terrains of Eastern Serbia.

Real intellectual and scientific enthusiast, promoter of many educational, scientific and social activities, Petković left an indelible trace on the science of geology at University and the Serbian Academy of Sciences. He made special contributions to regional geology, stratigraphy and tectonics, and by guiding younger generations also created a new type of geologist.

Author: *Nikolić, Predrag*



Branislav PETRONIJEVIĆ (1875–1954)

Serbia's most important philosopher and the famous scientist, B. Petronijević, was born in 1875, in the village of Sovljak near Ub, into an impoverished, traditionally cleric family. He completed primary and secondary education in his native village, Valjevo and Belgrade under austere financial conditions. He excelled at school and was particularly interested in philosophy, mathematics and physics. He started medical studies in Vienna but after the third semester he moved to the Faculty of Philosophy in Leipzig. He graduated there in 1897 and in 1898 he defended his doctoral thesis in philosophy, physics and botany.

Between 1898 and 1927, he was professor at the Department of Philosophy of Belgrade University. During World War I, he lived and

worked in London and Paris. He became a member of the Serbian Royal Academy in 1920. He retired in 1927. Despite serious financial and other kinds of worries, he remained active in philosophy and science. He died in Belgrade, on March 4, 1954.

Petronijević was completely devoted to philosophy and science. He worked very hard all his life, never accepting any kind of social engagements. Essentially he was a synthetic-deductive type of philosopher who divided the system of knowledge into three spheres: metaphysical, intermediary and empirical. Petronijević thought of himself as a *born metaphysician* and devoted all his efforts to creating an original system of the spiritualistic objective idealism. Into the metaphysical system he introduced a theory of cognition and philosophy of nature. He related his initial stance of *mono-pluralism* and the original *empiric-rationalistic theory of cognition* to his own *discrete geometry* and philosophy of developing nature. Petronijević was strict in everything he did. As synthetic philosopher and dialectician, he tried to merge primary philosophic doctrines: in gnoseology - empirism and rationalism; in metaphysics – monadology and substantialism; in ontology and methodology – dialectics and metaphysics (in Hegel's sense); science and religion, science and speculation and the like. His main philosophical work *Principles of Metaphysics* (I and II) remained unfinished.

According to Petronijević, his published works contained 53 original maxims, discoveries and innovations. He believed that the highest scientific level was attainable in mathematics, especially with his original discrete and finite geometry. Time and space are real forms of the being, and space itself is in simultaneous coexistence with *real points* and fragments of the being in time. Today's mathematicians consider this type of geometry unusual, perplexing and not strictly mathematically founded. However, it is possible that it still has not been adequately studied and it is also possible that *its quintessence* contains certain philosophical *foundation and truthfulness*. This mathematical quintessence is still not comprehensible and has to be discovered and further developed through strict matematization of Petronijević's ideas. He dealt with other mathematical problems but was less original. For a mathematician he demonstrated surprisingly broad scientific knowledge.

Petronijević published many texts in palaeontology, biology, comparative anatomy, physics, chemistry, astronomy and histories of these scientific disciplines. His most important results pertain to research of fossil birds. He discovered certain new features of the Archaeopteryx skeleton based on which he classified the Berlin variety as the new Archaeornis genus and made speculations regarding the origin, develop-

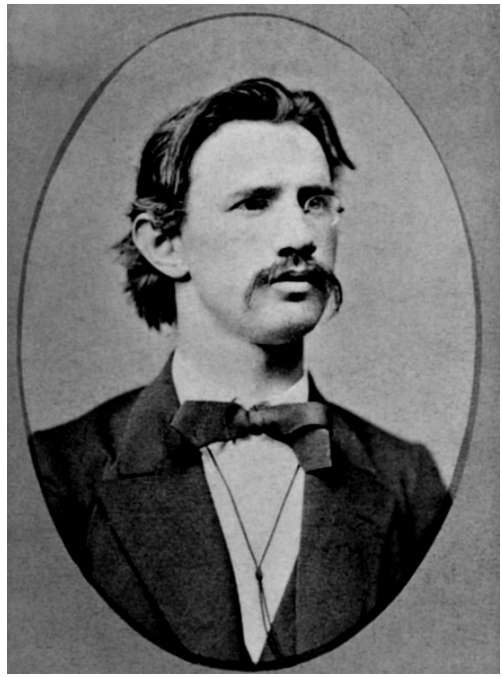
ment, taxonomy and characteristics of early birds. After the extensive examination of the five newly discovered early bird specimens, Petronijević abandoned the previous interpretations. Only his genuine discovery of the Archaeopteryx skeleton parts, located with the aid of his original method, remained.

Specially fascinating and important are Petronijević's contributions to the philosophy of natural sciences. These include clarification of Dollo's law of irreversible evolution, the introduction of his own theory of non-correlative evolution and detailed explanation of various segments of *universal evolution*.

All of his philosophical, philosophic-scientific and scientific activities, in line with earlier empiric and critical metaphisicists (Lotze, Herbart, Hartmann, Volkelt), directly and significantly contributed to, and facilitated, the formation of the modern field of cognition, nowadays known as methascience.

His strong and deep analytical and synthetic opinions, his creative intuition and especially the originality and impact of his concepts, helped Petronijević reach a climax of the metaphysical thought in our country. He enjoyed great respect in Europe and the rest of the world and through him Serbian science and philosophy also earned recognition.

Authors: *Grubić, Aleksandar; Prvanović, Mileva; Stojković, Andrija*



Dimitrije – MITA PETROVIĆ (1848–1891)

Mita Petrović, a professor of natural sciences and mathematics at Serbian Teachers' Training College in Sombor, was an outstanding scholar in his days. He wrote hundreds of articles and booklets, some outlying his original research results, most aimed at popularizing science and educating people. He also wrote a large number of textbooks. He organized and equipped a chemical laboratory in Sombor (the first such research facility in the history of this small provincial town, in the deep south of the Austro-Hungarian Empire) and there he conducted numerous chemical experiments. His interests focused on meeting the needs of the local people and included analysis of water, finding supplies of healthy drink-

ing water, doing analysis of local agricultural produce, especially wine and brandy, the soil, and the like. He was a pioneer of agricultural chemistry in our country. Occasionally, he wrote and published poems and short stories and also participated in political life.

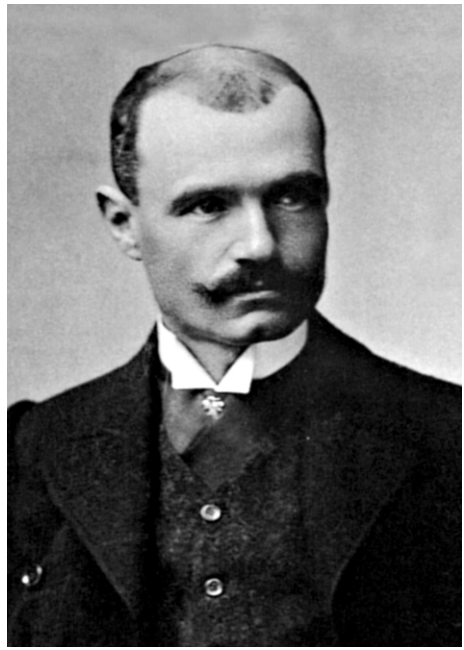
During his short and prematurely interrupted scientific career, Mita Petrović was well appreciated by his colleagues and he also received a fair number of academic awards. On several occasions he won prizes from the Matica Srpska and was a corresponding member of the Serbian Academy of Science, and a member of numerous other learned societies.

First, a short biography of Mita Petrović is given, then his chemical activities described and analyzed in detail, and lastly the appearance and the inventory of his chemical laboratory (which, as time went by, was completely destroyed and no trace of it exists today) is examined. His original scientific papers are analyzed, of which six articles published in *Zeitschrift fur Analytische Chemie* seem to be his most significant contributions to chemistry. However, some other papers and booklets could, from a domestic point of view, be considered more valuable: his analyses of drinking and swamp waters, as well as of soils of the Bačka region.

Mita Petrović wrote many textbooks (in the Serbian language) on all subjects he taught at Serbian Teachers' Training College. These were based mainly on contemporary German-language textbooks which Petrović translated and adjusted to the level and needs of his students. The output of Mita Petrović in popular science in amazing: he wrote articles on all imaginable topics related to science, education, pedagogy, economy, agronomy, various crafts, health, geography, geology, astronomy, ethnology, etc. Nevertheless, most of his articles are concerned with chemistry and chemical crafts. His articles are mainly in the Serbian language, but some are in German and Hungarian.

This article provides a complete bibliography of Mita Petrović's scientific papers, and a near-complete bibliography of books and articles about Mita Petrović. Mentioned are many of his popular-science tests, textbooks and the like. It does not, however, aim to produce a complete list of his published works. The huge scientific, educational and literary output of Mita Petrović has never been properly researched. There exists no comprehensive bibliography of his works. It is believed that several scientific and nonscientific works of Mita Petrović are yet to be discovered.

Authors: *Gutman, Ivan; Prodanović, Dragoljub*



Mihailo PETROVIĆ ALAS
(1868–1943)

Mihailo Petrović was a great figure of Serbian science and culture. Having obtained the highest possible education in Belgrade, he continued his studies at the Ecole Normale Superieure in Paris where he obtained the following degrees: Licence es sciences mathematiques (1892), Licence es sciences physiques (1893) and Docteur es sciences mathematiques (1894). His doctoral thesis *Sur les zeros et les infinis des integrates des equations differentielles algebriques* was approved by Ch. Hermite, E. Picard and P. Painleve. From 1894, when he returned to the country, until 1938 when he retired, Petrović was professor of pure mathematics at the Faculty of Philosophy in Belgrade.

Petrović published an impressive number of papers in important mathematical journals all over the world. He was primarily interested in what is now called classical analysis, but at the time was called modern analysis. In layman's terms, this is analysis of the properties of various real or complex functions defined by power series, definite integrals or solutions of differential equations. Some of his results were recorded in mathematical literature of the time. For instance, the most important finding from Petrović's doctoral dissertation is included in Picard's classic *Traité d'Analyse,* t.3, Paris 1896, pp. 356–359. In addition, many of his results served as a starting point for further research and were developed by other mathematicians.

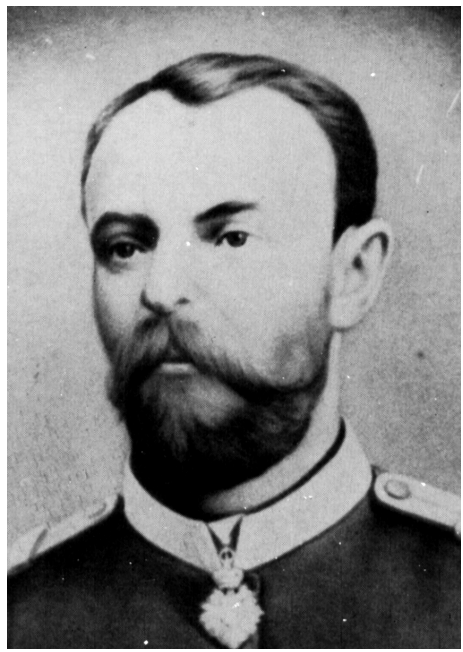
Petrović attended various international congresses presenting his papers and was a member of many academies and societies. He was an exceptionally successful and helpful teacher and organizer: numerous generations of mathematicians graduated and obtained their Ph. D. titles under his guidance. In 1894 he was the only professor of pure mathematics at the Faculty, but when he retired, in 1938, the Department of Mathematics was popularly called *a beehive of research*. He was the founder of two mathematical journals in foreign languages.

Petrović engaged in many other activities, too. He worked for the Army on issues of cryptography, had patents for five inventions registered, travelled widely and wrote several travel books, and played the violin in an amateur musical company. However, his main preoccupation, besides mathematics, was fishing (his nickname Alas stands for Fisherman). Fishing was not just a hobby for Petrović; he took it much more seriously. For example, he was delegated by the Ministry of Economy to conduct negotiations regarding fishing matters with neighbouring countries and he was also very active as a fishing legislator.

In 1941, at the age of 73, Petrović put on his Lt. Colonel's uniform, joined the Army, and spent several months in a prisoner-of-war camp in Germany.

Contemporaries of Petrović perceived him as an honest, honourable, and above all, an extremely modest man.

Author: *Kečkić, Jovan D.*



Sava PETROVIĆ
(1839–1889)

Dr Sava Petrović was born in Šabac, in 1839, where he attended primary and secondary schools. He finished Grammar School and the Lycaeum in Belgrade, and studies of medicine in Paris. He practiced medicine in Kruševac and Belgrade, and was a personal physician of King Milan Obrenović. He died in Belgrade in 1889.

His contributions to phyto-pharmacology, medicine and botany are noteworthy. He dealt with problems of depression (medical condition that young soldiers in the Serbian Army suffered from) and tuberculosis (a highly dangerous and, at the time, incurable disease).

However, the results he achieved in phyto-pharmacology and botany are far more remarkable. Petrović also compiled the first Serbian

Pharmacopoeia *Medicinal Herbs of Serbia*, describing about 450 medicinal plants. He wrote two voluminous botanical books, *Flora of the Niš Region* (*Flora Agri Nyssani*) and *Supplement to the Flora the Niš Region*, and a monograph on the endemic ramonda species found in the region of Niš- *Ramonda serbica Pančić and R. nathaliae Pančić et Petrović*. He also registered about 1600 plant species and described a number of new taxa: *Genista nissana, Nonnea pallens, Orobaonche serbica* (with Beck), *Ramonda nathaliae* (with Pančić), *Stachys milanii, Crocus hybridus (Crocus chrysanthusx adami), Edraianthus serbicus, Hypochaeris maculata ssp. pehvanovici, Hi-eracium praecox ssp. pljackovicense, Primula acaulis f. alba* and *Centaurea napulifera ssp. nyssana*. Petrović also discovered over 80 new plants species in Serbian, many of them endemic and relict.

Working together with Josif Pančić, Petrović facilitated exploration and study of the flora in Serbia's southern parts.

Author: *Randjelović, Novica*

Svetopolk PIVKO
(1910–1987)

Svetopolk Pivko was born on September 28, 1910, in Maribor (Slovenia) where he completed his primary education and in 1928 graduated from Belgrade College. He began his technical studies in Prague but completed them in Belgrade, in 1933. The following year he left for France, where he did his specialist studies and in 1938 defended his doctoral thesis in the field of aerodynamics.

His first employment in the country was with *Zmaj*, the airplane and hydroplane manufacturer in Zemun. During World War II he was active both militarily and politically. His political career began during his student's days in Prague, only to be continued in Belgrade and Paris. After the war he went to Russia where he finished his air training. In 1945 he was

appointed deputy commander-in-chief of the Yugoslav Air Force. He initiated the setting up of the Aeronautical Institute of the Federal People's Republic of Yugoslavia, and was its first Administrator. He participated in the creation of experimental facilities and in the devising and evaluation of some of domestic planes. His active military service terminated in 1946 and he retired from it with the rank of air-force group captain.

In 1960 Svetopolk Pivko was elected full professor at the Faculty of Mechanical Engineering in Belgrade, and two years later, in 1962, also at the Faculty of Mathematics of Belgrade University. He taught the following subjects to graduate and postgraduate students: statics, kinematics, dynamics, theory of oscillation, missiles, analytical mechanics, aerodynamics of airplane propulsion, theory of lifting surfaces and aerodynamics of missiles. For a number of years he was the Head of the Mechanics Department at the Faculty of Engineering.

Svetopolk Pivko was Editor-in-Chief of the magazine *Our Wings* and was also on the editorial board of the magazines *The Voice of Air Force* and *Publications de l'lnstitute Mathematique*. He was well versed, actively and passively, in eight languages and was the recipient of eight domestic and foreign decorations.

In 1961 he became a member extraordinaire of the Serbian Academy of Sciences and Art and in 1976 its full-fledged member.

Svetopolk Pivko's research was mostly in connection with theoretical and experimental aerodynamics. During his specialization years in France, he studied the best position the propeller could have in relation to the wing which brought about the emergence of aerodynamic force on the carrying surface of the plane under the influence of the air jet of the propeller. The phenomenon was named after him and is now known as the *Pivko effect*. His improved definition of the utilization degree of the carrying propeller was later accepted in technical literature. Pivko also conducted a through research of the aerodynamic drive of airplanes and the aerodynamics of the ring wing. He was commissioned to work on the Military Encyclopaedia for which he wrote several expert pieces on aerodynamics.

Pivko wrote 123 scientific papers, 6 textbooks, 3 monographs and 14 technical essays, which were published in 178 journals and periodicals. Abroad he had 38 papers published, out of which 17 came out in France, 7 in England, 5 in the Federal Republic of Germany, 4 in Holland, and 1 in Belgium, Switzerland, Romania, the USA, and Canada. He participated in the working of 68 domestic and foreign conventions, 32 at home and 36 abroad, where he presented 25 papers.

Svetopolk Pivko died in Belgrade, on October 13, 1987.

Author: *Zeković, Dragomir*

Aleksandar – ŠANDOR V. POPOVIĆ (1847–1877)

Aleksandar V. Popović, the first Serbian geologist, came from an old and famous clerical family in Stapari. He was born in Stari Bečej, on December 10, 1847, just a few months before the Hungarian Revolution broke out. His family were traders. They lost their fortune in the Revolution. His father died early, so his mother and his older brother Stevan had to take care of the family.

He finished his elementary school in Stari Bečej and attended Catholic Grammar School in Budapest. As a student, he lived at the Tekelianum boarding school. He studied hard, joined and actively participated in the working of the United Serbs' Youth Association, learned foreign languages, played the violin, translated and wrote poetry.

He studied natural sciences at the Faculty of Philosophy in Budapest. At the Faculty, he was particularly interested in mineralogy and geology lectures held by Prof. J. Szabo. He planned to stay one more year at the University, to finish his professorial examination, but went to Novi Sad instead, in 1871, to accept a teaching position for the subject of natural sciences at Serbian Grammar School. He passed his professorial examination two years later. He taught his pupils with same enthusiasm in the classroom as he did at many field trips, and he was loved and highly respected by them.

Geology was his main interest. His original and systematic work on trachytes from Mount Fruška Gora was published in 1873. This work earned him membership to the Hungarian Geological Society in 1874. Soon after that, his findings on trachyte presence at Petrovaradin appeared in the *Vienna Geological Society Gazette*, thanks to which he became corresponding member of that highly reputable institution. His main work on the geology of Mount Fruška Gora was published in the Hungarian language, in 1876, in two volumes:

1. *On magmatic rocks*
2. *On sedimentary rocks.*

Greater part of his work on sedimentary rocks was translated into Serbian, by M. Krečarević, and published in 1881. In Vienna, Popović published another paper on the presence of gabbro at different locations on Mount Fruška Gora.

From August, 14 to September, 20 1874, A.V. Popović accompanied Prof. J. Szabo on his trip to Serbia. Their main interest was trachytes rocks, but they also collected and recorded other rocks in the vicinity. All the findings collected during this trip were later on classified and published in his work *Geological Notes on Serbia* (1875).

This voluminous piece of writing was one of the most important works of Popović at the time it was published. It represented, along with publications of Josif Pančić, a solid foundation for our geology especially its tested scientific terminology pertaining to geology and mineralogy (originally, Pančić theoretically developed this terminology in his textbooks). The work's value also lies in the fact that many geological data about Serbia were gathered and presented in one place for the first time, serving for future reference.

Popović's books on geology clearly demonstrate his efforts at conducting systematic research aimed, according to his brother Stevan, at *establishing geological connections between Mount Fruška Gora and the Balkan Peninsula*. He was not a universal scholar like many men of his time (Pančić, for example), but in science he was clearly predestined for

geological research. This explains why there were not many written works by A. Popović and why everything that he wrote was on he subject of geology. The topics and the quality of his work undoubtedly lead to a conclusion that he was truly a genuine as well as the first professional geologist in Serbia. His works on Mount Fruška Gora and Serbia are quoted even today.

Sadly, his life was cut short by tuberculosis, an incurable disease in those days, in his prime and just as he opened wide the door of science and was starting his doctoral dissertation. He died a month before he turned thirty. His family, friends, colleagues, associates and the entire Serbian nation, were deeply saddened by his departure.

Author: *Grubić, Aleksandar*

Dragutin PROSEN (1907–1984)

Prof. Dragutin Prosen was born in a small village of Ilirska Bistrica in Slovenia, which, at the time, was part of the Austro-Hungarian Empire. At the age of eleven, he had to move to Susak, 30 km away from his parent's home. He completed secondary education in Susak at the age of 18. Being a very bright pupil, with excellent grades, he had the privilege of studying at Military Academy. He graduated from the Military Geodetic School, attended between 1928 and 1932, and went on to study at the Military Academy, where he was promoted to the rank of an officer. He was a diligent student and his professors respected his sense of punctuality. The mentioned qualities earned him a place on an international team

whose task was to measure longitudinal coordinates. The project, intended to verify the Wegener hypothesis of continental draft, commenced in 1933. Prosen suggested that the Earth's gravity be taken into account, too. He was in charge of setting up the project for which he used a set of Schtuchard pendulums for gravity measurements and the aim of which was to calculate the periods of four pendulums of the set within accuracy down to a fraction of one tenth of a million of a second. It was achieved successfully both at Potsdam Observatory in Berlin and in Belgrade. Unfortunately, the data was lost when World War II broke out in Yugoslavia. Finally, Prosen managed to determine gravity value at a station at Belgrade airport. He used Worden gravity meter and measured the difference in gravity between the airports of Paris and Belgrade by taking commercial planes, with a team in each city doing the measuring, and the air-crew carrying the gravity meter between the cities. Later on, he made a basic gravity network that spread from the north to the south of Yugoslavia, and which became essential for taking systematic gravity measurements all over the country.

During World Was II, Prosen was taken prisoner of war, but managed to escape and reach Zurich, Switzerland, where he stayed until the end of the war. There he became an assistant to Prof. F. Gassmann at the Geophysics Department of the Institute of Geophysics.

Prosen returned to Yugoslavia after the war, and in a short time set up the Geophysics Department at the Geological Institute of Yugoslavia. As there were no professional geophysicists, he invited students from the Department of Geology of the Technical Faculty. He spent some time tutoring his students and finishing gravity and magnetic prospecting. Prosen's first success was impressive resulting in the discovery of the first oil field, at Velika Greda, in 1949. After that many more many across Vojvodina, part of the Pannonian plain, were found. He organized several geophysical field–trip teams with his students being team leaders and taught them how to do geomagnetic and geo-electrical prospecting all over Yugoslavia. Results achieved were very impressive and many oil and gas fields, with lead, zinc, copper and iron ore deposits were discovered. Due to remarkable research results, the Government helped the Geophysics Department obtain several instruments, quite sophisticated in those days. Very soon this institution became one of the largest of its kind in Southeastern Europe.

Belgrade University offered Prosen the position of an associate professor of geophysics. He accepted it and was soon promoted to full pro-

fessor. Many years of working in education resulted in him being appointed Head of the Department of Geophysics, and Dean of the Faculty of Mining and Geology. Additionally, he was very active working and supervising activities at the Geophysical Institute.

In 1960 Prosen introduced Deep Seismic Sounding (DSS) method for Earth's crust studying. At first, the method was used to measure the thickness of the Earth's crust along seismic profile generally following the NE-SW direction. The results determined the thickness of the Earth's crust which stretched 30 km under the Pannonian plain, and 45-50 km under the Dinarids. Finally, as the Head of the Geophysics Section of the KBGA, he suggested shooting a profile several thousand kilometers long: starting in Ukraine, passing Poland, Romania, Hungary and reaching Yugoslavia. It was rather surprising to find out that the Earth's crust was only 25-30 km thick under the Pannonian plain. Those results were crucial for understanding the global geology of Southeastern Europe.

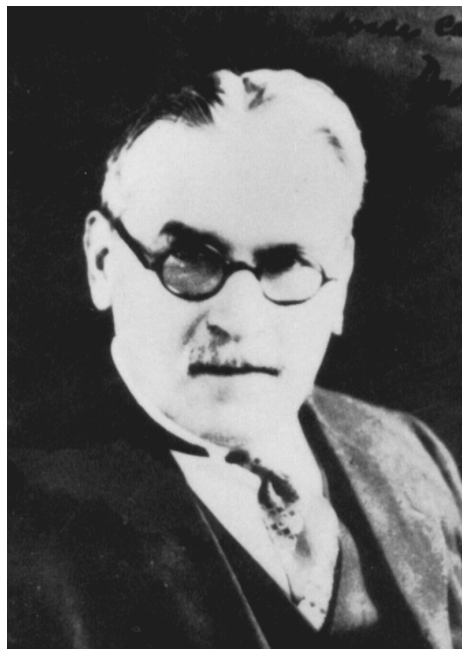
A destructive earthquake occurred in summer 1963, affecting the southern part of Yugoslavia and nearly destroying Skopje, the capital city of Macedonia. The number of fatalities exceeded 1300, and a few thousands other casualties were hospitalized. It was then that Prof. Prosen decided to develop an investigative method which would become useful in erecting safe constructions in regions at great risk of being struck by an earthquake. The method was effectively tested on the territory of Skopje, and was applied, later on, in many other potentially active seismic zones in Yugoslavia. He wrote a number of essays describing methods of crucial importance for safe building in seismically active zones.

Prosen was a devoted teacher and mentor to nearly one hundred students who graduated from the Department of Geophysics, five of them obtaining their Ph.D. titles under his mentoring. He was fluent in French and German, and he read French and Russian literature as well. His multilingualism was particularly relevant for his nomination for the presidency at the Geophysical Committee of the KGBA whose members were experts from all East European countries and who, especially his senior colleagues, considered it a valuable asset in their mutual activities. It was particularly useful for the organization of the KGBA General Assembly in Belgrade, in 1962.

Prosen was bestowed many awards and honours for his life time achievements. He was an outstanding scholar, whom his students acknowledged by devoting to him the book entitled *Metallogeny and Plate Tectonics in Northeastern Mediterranean.*

He was forced to take early retirement due to strict implementation of a state law by the Faculty. Nevertheless, he actively performed his professional duties with geophysical institutes all over Yugoslavia. Prosen wrote several texts of great importance for civil engineers studying seismic activities.

Author: *Stefanović, Dragoljub*



Mihajlo – IDVORSKI PUPIN (1854–1935)

Mihajlo Pupin was born on October 9, 1854, at Idvor, which at the time was part of the so-called Military Frontier of Austria. The settled Serbs, strictly speaking, were Austrian subjects but were allowed to use their language and observe their customs.

Mihajlo Pupin's parents were illiterate but intelligent and well-respected farmers, who brought up their son to respect and preserve the spirit of old Serbian traditions. Mihajlo's father was elected the village elder on several occasions. The young Pupin acquired the basic knowledge of his mother tongue, the reading and writing skills, and arithmetic, at elementary school in Idvor. His schooling was continued in Pančevo, in

1869, where he was fortunate to have good teachers, particularly of natural sciences. For participating in a parade honouring Svetozar Miletić, during which he was caught trampling on the Austrian flag, Pupin was nearly expelled from school, so the following year he was sent to Prague where he continued his education. He stayed there for a short period when, following his father's sudden death, he decided to travel to America. After two weeks of arduous voyage across the Atlantic, he arrived to the United States at the end of March in 1874. Having no school diploma or certificate of apprenticeship, he experienced some very hard times during his first years in America. He managed, after some toil, to pass the entrance examination and enroll at Columbia College, in autumn 1879. After graduating from it in 1883, he received a scholarship to continue his studies of theoretical physics. The following six years he spent studying physics and electrical engineering at Cambridge, England and Berlin, Germany. In Berlin, Pupin committed himself to studying physical chemistry and under the mentoring of Hermann von Helmholtz he wrote, and successfully defended, his doctoral dissertation entitled *Osmotic Pressure and its Relationship to Free Energy* in 1889.

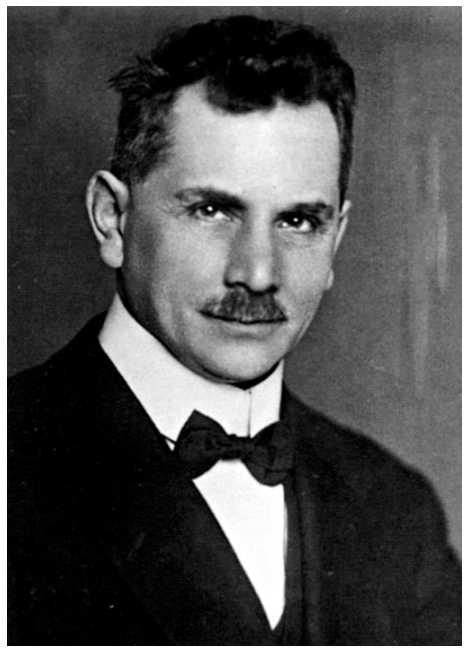
Pupin began his academic career in 1889, as a lecturer at the newly established Electrical Engineering Department at Columbia College in New York. He immediately dedicated his time and energy to scientific research. Before long he was appointed associate professor, and in 1901 professor of electro-mechanics. At Columbia College, Pupin first taught mathematical physics, then thermodynamics and hydraulics. His first major scientific success came after he investigated the harmonics of sources of alternating currents. This work led Pupin to invent multiplex telegraphy, for which he owned several copyrights, and to develop technology that is still applied in telecommunication systems. Only two months following the discovery of X-rays, Pupin made successful prints, and after only three months of investigations, he made several original discoveries, which on April 6, 1896, were communicated to the New York Academy of Sciences. Pupin's greatest achievement was finding a solution to the problem of long-distance telephone transmission by use of induction coils, which he tested in practice. His discovery enabled transmission of telephonic signals between cities, which was an enormous leap forward in the development of telephony. The importance of this discovery was only lessened in the 1930s, following the development of electronics, but to this day the Pupin system has been used in some special cases. After these discoveries, the name of Michael Pupin, highly respected in scientific circles, also became widely known to the general public in the United States and Europe. Pupin became rich and famous.

Unfortunately, working on practical issues regarding the application of the Pupin system in telephony absorbed so much of his energy that he abandoned the mainstream research of the fundamental problems of physics, the area in which he started his career. Trying to solve many problems arising from the application of the Pupin system, Pupin arrived at new solutions regarding utilization of alternating current. From 1901, when he received his professorial tenure, Pupin's successful scientific and teaching careers continued to develop quickly until 1929, when he retired.

In recognition for his achievements, Pupin was elected president or Vice-President of the highest scientific and technical institutions, such as the American Institute of Electrical Engineers, the New York Academy of Sciences, the Radio Institute of America, or the American Association for the Advancement of Science. Pupin protected a total of 34 of his inventions by patent in the period between 1894 and 1934, nearly all in the field of telegraphy, telephony and radio. He received a large number of diplomas and medals in recognition for everything that he had created. He published several books between 1894 and 1930. Particularly valuable and interesting are his *Thermodynamics* and his autobiography *From Immigrant to Inventor*, published for the first time in the United States in 1923. Pupin maintained close contacts with his compatriots in America and helped them in various ways until the end of his days. He set up a number of aid funds and considerably helped the drawing of Yugoslavia's frontiers in 1919.

Pupin died in New York City, in 1935.

Author: *Marinčić, Aleksandar*



Nikola A. PUŠIN
(1875–1947)

N. A. Pušin was born in Saratov (Russia), in 1875. He graduated from the Natural Sciences Department of the Faculty of Physics and Mathematics, the University of Sankt-Petersburg. After graduation, he worked for three years in a Gun-powder factory near Sankt-Petersburg and was also a teaching assistant to Prof. N.S. Kurnakov at the Electrotechnical Institute. He worked in the field of electrochemistry and was soon put in charge of the Laboratory for Electrochemistry at the same Institute. With Prof. Kurnakov he started a serious research in the field of binary metal alloys, investigating their physicochemical properties (electric conductance, hardness, melting points, etc.) and functions of their

composition. Pušin worked especially hard to obtain the adequate solid liquid phase diagrams for a great number of binary alloys studied. He went to Gettingen in 1905 and there, at the laboratory of the famous Prof. Tammann, studied the effects of high pressures on the melting points and composition of authentic mixtures, and phase diagrams in general. In 1909 he became an associate professor of electrochemistry at the same Institute in Sankt-Peterburg, and Head of the Electrochemistry Laboratory. During 1919-1920 Pušin was professor of physical chemistry in Vladikavkaz, in the south of Russia. He fled Russian in 1920 because of the Revolution and arrived to Belgrade. He was granted honorary professorship for the subjects of electrochemistry and electrometallurgy at the Technical Faculty, Belgrade University, but in less than a year he was appointed professor of physical chemistry at Zagreb University. Pušin spent 8 years in Zagreb, as the Head of the Physical Chemistry Department and also teaching physical chemistry, organizing laboratory work and continuing research on binary alloy systems started a long time ago in Sankt-Peterburg. Due to some administrative problems regarding his tenure at Zagreb University, he applied for a position of a professor of physical chemistry at the Chemical Technology Department of the Technical Faculty in Belgrade, and moved to Belgrade in 1928. In 1927 he obtained a Ph. D. title from Ljubljana University.

In Belgrade Pušin joined the already existing Laboratory for Physical Chemistry and Electrochemistry headed at the time by the young senior lecturer P.S. Tutundžić. After the Technical Faculty was relocated to new and bigger premises in 1930, the Laboratory was upgraded and converted into the Institute of Physical Chemistry and Electrochemistry with Prof. Pušin in charge. He stayed there until 1947 when he died of a serious illness.

During the 1930-1947 period (except for the War years), Professors Pušin and Tutundžić worked together at the Institute. Pušin taught physical chemistry and also ultrapoisons, while Tutundžić taught electrochemistry.

Pušin devoted the last years of his life to researching binary systems, but mostly the systems consisting of mixtures of various inorganic salts, organic substances (e.g., various alcohols, acids, amines, heterocyclic compounds, etc.), or their combinations. Again, this involved studies of viscosity, conductivity, refractive index and similar properties as functions of composition of binary systems, phase diagram properties and structure of new compounds formed between the components. Pušin alone, or together with his coworkers, published about 120 scientific papers in German, British, Russian and Serbian scientific journals. Many

of his papers were quoted in the other research papers and monographs about binary phase diagrams.

Pušin was also an active member of the Serbian Chemical Society, and the founder and Editor of the *Chemical Society Gazette* (*Glasnik Hemijskog društva*) during 1930–1947.

Pušin received *the Becketov Award* from the Russian Physical Chemistry Society for his work on mercury alloys, and *the Ilijenko Award* from the University of Sankt-Peterburg for helping with the extraction of aluminum from Russian ores. In 1947 Pušin became a corresponding member of the Serbian Academy of Sciences in Belgrade. Unfortunately, his serious illness prevented him from continuing his active research and he soon died, in October 1947.

Author: *Dražić, Dragutin*

Dragoš RADENKOVIĆ (1920–1991)

Dragoš B. Radenković was born and educated in Belgrade. The onset of World War II, in April 1941, interrupted the sixth semester of his civil engineering studies. During the war, he was active in the illegal liberation movement of Yugoslavia. Towards the end of the war, he joined the Yugoslav army from which he was demobilized in November 1951, with the rank of an officer. Meanwhile, he graduated from the Faculty of Civil Engineering in Belgrade. After that, he commenced intensive studies of the theory of elasticity. He became a part-time associate at the Institute of Mathematics and the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts. He was elected senior lecturer for

the subject of the theory of elasticity at the Faculty of Civil Engineering. His career as a lecturer began in 1951 when he took over teaching the strength of material from his senior colleague Milan Djurić. Radenković and his predecessor used continuum mechanics as the foundation for the subject they both taught, which in those days was a novelty. At the same time, Radenković became an editor of the *Applied Mechanics Review* magazine published in the USA as well as of the *Zentralblatt.* He later became a member of the editorial board of the *Mechanics Research Communications* magazine. From 1958 onwards, he worked as an assistant at the Institute of Nuclear Sciences at Vinča, near Belgrade and *Jaroslav Černi* Institute of Hydrotechnics in Belgrade. At the same time, he organized *Seminar on the Theory of Plasticity with the Basics of Rheology* at Belgrade's Faculty of Civil Engineering, which heralded the setting up of postgraduate studies at the Faculty.

His first scientific papers on the theory of elasticity and later on the stability of elastic balance in particular, were published in 1951. In 1953, at the Faculty of Civil Engineering in Belgrade, he presented his doctoral thesis entitled *Bending of Curved Rods in a Plane* which treated problems of finite strain and stability.

During 1953/54, Radenković spent eight months in England on a British Government grant where he co-authored and published two papers with W. Shepherd (listed in the Works, items 8 and 9). At the end of 1960, while his position of full professor was being decided, he left Belgrade and, following an invitation from the Faculty des Science, went to Grenoble. Two years later, he went to Paris to the l'Ecole Polytechique where he accepted a position of a research director in the laboratory for the mechanics of solids. There he conducted research work and was a mentor of doctoral dissertations. He spent the rest of his life in France.

Included in the scientific opus of D. Radenković are the following fields of study: 1) linear elasticity; 2) stability and theory of finite strain in elasticity, visco-elasticity and plasticity; 3) plasticity in soil mechanics and rock mechanics; 4) theoretical plasticity; 5) theoretical generalization in the analysis of solid bodies behaviour; 6) problem of residual stresses and thermo-mechanical effects during welding; 7) fracture mechanics; 8) fatigue of materials.

As a lecturer of the Belgrade Faculty of Civil Engineering, and the decade spent in the department of Prof. Hlitčijev, Radenković together with Milan Djurić and Nikola Hajdin represented the core of a modern school of civil engineering. During the 30 years which he spent in France, he was always in contact with his *alma mater.* He was mentor to Ph.D. candidates and a participant at scientific gatherings. He also

helped a number of young Belgrade associates reach France, on several months' long study visits, the proof of which is found in jointly published papers.

In 1982, following a proposal by the Department of Technical Mechanics and Theory of Structure of the Faculty of Civil Engineering in Belgrade, he was awarded *the Order of the Republic with the Silver Wreath* by the Presidency of Yugoslavia for his work achievements.

Author: *Naerlović-Veljković, Natalija*

Djordje RADIĆ
(1839–1922)

Dr. Djordje Radić is rightly regarded as a pioneer and one of the greatest figures in Serbian agricultural science of the 19th century. He made a great contribution to the advancement of agriculture, agricultural schooling and education in general, in Vojvodina, Serbia, and Montenegro.

He was born on April 22, 1839, in Veliki Bečkerek in Vojvodina. He completed his agricultural studies in Bohemia, and in 1859 passed the *great agricultural examination* in Prague. The president of the exam committee was Prince Karl Schwarzenberg, who offered Radić an opportunity to put his knowledge in practice on his estate.

Having returned home, Djordje Radić spent some time in Vojvodina thinking how to improve the agricultural situation in Vojvodina. In 1862 he made a tour of some farming areas in Austria-Hungary. He also travelled to Switzerland and France in 1865, central Germany in 1866, and France, Belgium and the Netherlands in 1867 for the same reason.

Radić passed his professorial examination in natural sciences in 1864, at the University of Vienna, whereupon he was appointed high school teacher in Novi Sad. In 1867, at the age of 29, he obtained his Ph.D. in philosophy from the University of Vienna thus being the first Serb to earn such a high degree from this institution.

By invitation of Prince Mihailo and the founders of the Serbian Agricultural Society, Dr. Radić moved to Serbia, where he settled down for the rest of his life, except for a three-year period which he spent in Montenegro.

Early on in his professional life in Vojvodina, Radić set up a modern poultry farm and apiary, and an experimental station for crop farming. In 1862 he took up editing of the illustrated magazine *Seljak* (*Farmer*), which published articles on agricultural and farming issues until 1896, when the paper closed.

Arriving in Serbia as secretary of the Agricultural Society, Radić organized the first national agricultural exhibition in Kragujevac and held well-attended lectures on agriculture at Belgrade College. This was also the period of his most prolific writing activities. In 1872 he greatly helped with the setting up of the School of Agriculture and Forestry in Požarevac.

In 1875, by personal invitation of Prince Nikola, he went to Montenegro and set up the first agricultural school in Danilovgrad, which closed after the war with the Turks broke out in 1876. Radić then went to Cetinje, where he attended mostly to administrative duties until 1878, after which he returned to Serbia to resume his professorial duties at the School of Agriculture and Forestry in Požarevac.

In 1882 he founded the Agricultural School in Kraljevo and remained its director until 1897. In 1904 he was re-elected secretary of the Serbian Agricultural Society but her retired in 1911. He died on October 11, 1922, and was buried in Kraljevo.

Not only was Dr. Djordje Radić the editor of several farming journals: *Farmer* (1862-1869), *Tiller of the Soil* (1870–1872), *Home Journal* (1880-1881) – in Vojvodina and Serbia, but he also wrote 41 technical books and textbooks, and had nearly 600 articles published in agricultural periodicals.

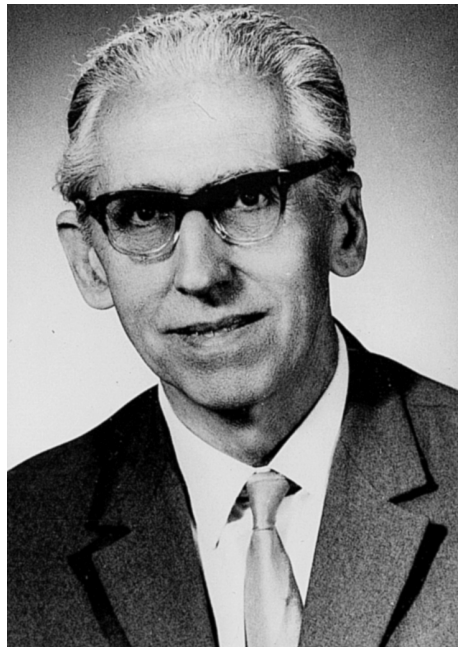
Radić introduced various species of plants which were subsequently propagated among the farmers; did experimental work on various plant

species; introduced new farming equipment; improved cattle breeds and hybridization of sheep; conducted experiments in silk worm culture; established nomenclature and names of plants, particularly of fruit trees in Serbia; designed an atlas of plants cultivated in Serbia; and put scientific and professional knowledge in practice.

He received special awards and high public honours for his work and achievements. He was a member of the Serbian Academy of Sciences, and a full or corresponding member of many Serbian and foreign agricultural, learned, and cultural societies. Many of his books received public acclaim and awards.

Dr. Radić deserves praise for helping the development of Yugoslavia's agriculture, agricultural schools and science. Not only was he an expert in his profession, but was also a man of broad intellectual horizon and valuable national and political ideas.

Authors: *Pavićević, Ljubo; Mijušković, Milorad*



Miloš RADOJČIĆ
(1903–1975)

Miloš Radojčić ranks as one of the best Serbian mathematicians that were born at the beginning of the 20th century, and the first and only one that could be distinguished from the famous mathematical authority, Mihailo Petrović. He chose one of the most difficult research topics in science, introduced three new courses at the Mathematics Department of Belgrade University, and wrote two books of the highest rank. Radojčić demonstrated to his students the true nature of mathematics by teaching them with greatest meticulousness. He wrote a book *General Mathematics* in which he brought to focus the importance of the history of mathematics for the development of the mathematical thought. His

contribution to that essential science was evident as he performed duties of a university professor with utmost dedication and conscientiousness.

Radojčić was an intellectual of broad culture, resourceful and very interested in many different areas of human creativity such as philosophy, poetry, drama, and arts; also the Serbian folk literature, works of Njegoš and fresco painting. He studied remarkable characters of European poetry and philosophy. He was even interested in great world religions, Christianity and Buddhism and ranks as one of the greatest Serbian intellectuals from the first half of the 20th century.

Radojčić spent his life teaching – at Belgrade University until 1959, and at the University of Khartoum in Sudan until 1964. He was also an associate of the National Center for Scientific Research in Paris (Centre national de la recherché scientifique) and a corresponding member of the Serbian Academy of Science. While in Serbia, he greatly facilitated the development of the Theoretical Mathematics Department of Belgrade University. The level of his teaching was of the highest standard. He cultivated the purity of the Serbian language and wrote in a style that may be considered exemplary.

Radojčić introduced the following subjects in the mathematics syllabus at Belgrade University: synthetic geometry (Euclidean geometry and the geometry of Lobacevski) and descriptive geometry. The scientific work of Miloš Radojčić covered two mathematical areas: the theory of analytic functions of a complex variable and the theory of relativity. The topic of his work was the multiform analytic functions and their Riemann's surfaces.

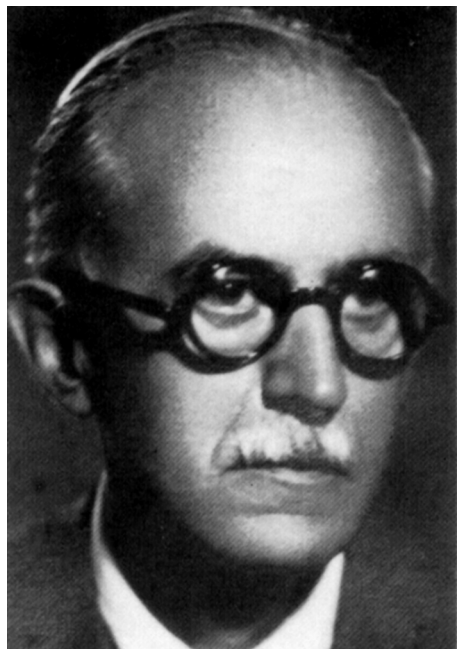
In the theory of analytic functions, Radojčić proved that every analytic function (in whichever area of the Riemann's surface) can be approximated with algebraic functions. Also, he generalized the famous statements of Vajersstras and Runge about the representation of analytic functions with polynomials and rational functions to the full extent. He also generalized the famous Kosi integral formula, adapting it to domains on Riemann's surfaces. In the geometric theory of analytic functions he gave a general method for the splitting of whichever Riemann's surface into simple parts, wherever such splitting is possible, as the case is with the unlimited Riemann's surfaces. It gave him a basis for further work in general automorphic functions, as it did for the Japanese mathematician Shimizu (an example of that would be Radojčić's conclusion that every meromorphic function is somewhat automorphic). Also, Radojčić studied the topologic properties of analytic functions in the proximity of essential singularities, including the problem of the type of Riemann's surfaces: a problem that was considered by a number of important mathematicians at the time.

Miloš Radojčić applied the geometric method of verification whenever he could, particularly evident in the splitting of the unlimited Riemann's surface into simple parts. According to the renowned German mathematician E. Ulrich, Radojčić achieved utmost results with that method. Radojčić also proved to be an excellent university professor. His intention was to write a book for every subject he taught and so he produced three exceptional books: two for students of mathematics, and one – on the history of antique mathematics – for students of philosophy. He was a man of highest moral.

In his studies of mathematics, Miloš Radojčić also worked on the axiomatic foundation of the special theory of relativity. However, he had ideas about the way the general theory of relativity could be formulated axiomatically. The summary of his finished work in this area is presented in the monograph *Une construction axiomatique de la Theory de Vespacetemps de la Relativité restreinte,* Monographic t. CDLXII, Acad. Serb des Sc et des Arts, 1973. His approach to this problem was based on the principles of axiomatic foundation only known to Radojčić, and was essentially different from the approach of other scientists who were concerned with the foundation of the theory of relativity (for example S. Basri [B], A. Lihnerovich [Li] and P. J. Pimenov [P].

Radojčić did not include any of the completed structures in the axiomatic foundation of the theory of relativity, believing that *the topic of such fundamental importance as the cinematics of the Theory of relativity, which includes the very basic Euclidean geometry, deserved an independent and simple approach*. He had a motto - *the fewer assumptions, the more evidence.* Similarly, he disapproved of the derivation that was analogous to the derivation of some known and appreciated constructions (such as [Rb]). He thought that axioms, in terms of their physical interpretation, ought to be as close to the observable facts as possible.

Authors: *Dacić, Rade; Mateljević, Miodrag*



Aleksandar RADOSAVLJEVIĆ (1877–1956)

Aleksandar Radosavljević was born in Budapest, on August 26, 1877. He completed his elementary and secondary education in Belgrade. In 1898 he started medical studies in Vienna and obtained his diploma, signed by Rector G. v. Escherich, on July 14, 1904. He received a prize, a microscope, for his outstanding grades on which, ironically, he discovered that he had tuberculosis. He returned to Serbia and started practicing at a hospital in Šabac. Due to his illness, he spent the period between 1905 and 1909 at Prof. Neisser's clinic in Vienna, Alland Sanatorium near Vienna, and Haoergas Sanatorium near Graz, where he specialized in internal medicine. He returned to Belgrade and opened a private practice

where he worked till 1912. The First Balkan War was one at the time. Radosavljević was drafted and he served as a regiment physician of the Serbian army, and then as a chief of a field hospital where he treated patients affected by typhoid fever.

As he himself was treated for this type of fever, as a convalescent he was appointed personal physician to the famous Serbian military leader Vojvoda Putnik. Radosavljević later on accompanied him, and the Serbian army, through their arduous retreat through Albania, all the way to Corfu and Nice. As a member of a military delegation in Paris, he specialized in pulmonary tuberculosis at the Pasteur Institute, and under Prof. Widal at a Paris clinic, in his free time. At the end of 1918, upon his return to his country, he worked as a physician at the Department of Internal Medicine of the General Military Hospital in Belgrade, a general state hospital at the time. On April 1, 1922 Radosavljević was elected part-time professor of internal medicine at the Medica School in Belgrade. In 1923 he founded the Third Clinic for Internal Medicine in Belgrade, and was appointed its Administrator. He kept the position until World War II broke out. He was elected Dean of Medical School Faculty on two occasions (1930 and 1933).

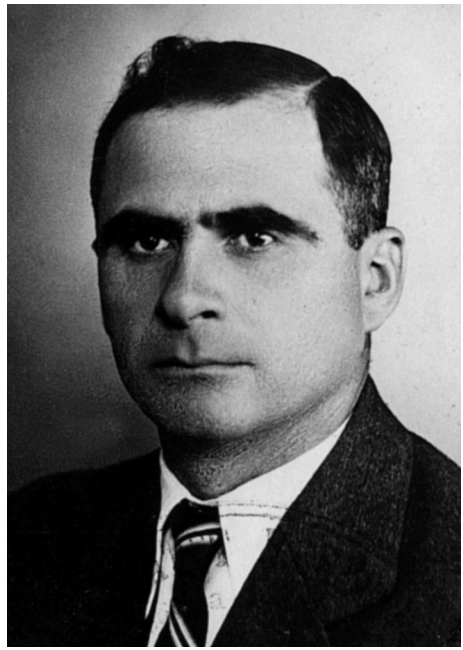
Radosavljević took retirement during the 1941-1945 occupation, but after 1945 went back to work as a full time professor at the Medical School in Belgrade. He was also the Administrator of the Third Clinic for Internal Medicine. He died in 1956.

Scientific and research opus of Prof. Radosavljević reveal his natural talents, objectivity, persistency, honesty, integrity. Studying in Vienna and Paris at the world's most prestigious medical schools at the time and specialization under Professors Neisser and Widal were of paramount importance for his development. Simultaneously working in hospital wards and clinical laboratories during his studies, and specialization and practice at the clinics provided him with best opportunities for testing his clinical observations.

As a physician, A. Radosavljević studied various illnesses: malaria, pulmonary disease, and especially tuberculosis and tried to establish successful methods of detection and treatment of those diseases. His articles appeared in daily papers and various magazines for general public. He also organized doctors in professional associations (the Association of Phthisiology), wrote articles in professional journals and founded the Department of Phthisiology at his clinic, which later on became a separate institute. He was our first scientist who wrote textbooks on pulmonary diseases and pulmonary tuberculosis, and supervised a group of doctors using the B.C.G. vaccine.

As a scientist, A. Radosavljević was interested in reactions of the human body to diseases and various medicaments, or more specifically immunology and allergology. He first published his scientific reports in our country, and Europe's leading scientific journals also published his findings about allergic reactions in malaria outbreak. He became a member of the Serbian Academy of Sciences in 1951.

Author: *Slavković, Vladimir*



Milutin M. RADOVANOVIĆ (1900–1968)

Milutin Radovanović, the great Serbian authority on the world of nature, was born on March 2, 1900, into a well-to-do farmer's family in Tabanović, near Šabac. He finished elementary school in his native village and, after a long break, Grammar School in Šabac. He obtained the best education at the Faculty of Philosophy, the Institute for Phyletic Studies, of Thuringhishe University at Jena, Germany, and at the Leopold-Franzen Faculty of Philosophy, in Innsbruck, Austria. He completed his studies and obtained his Ph. D. title in 1929, at Jena.

After returning to his country, the Kingdom of Serbs, Croats and Slovenes, Radovanović worked as a substitute teacher is several high

schools. He was also appointed assistant at the University of King Alexander in Ljubljana before getting a transfer to Sarajevo's Country Museum. For a short period of time, just before World War II, he worked at the Serbian Country Museum in Belgrade, and then at the Faculty of Agriculture in Sarajevo, as its first professor. During the war, he was appointed associate professor at the Faculty of Agriculture and Forestry, Belgrade University, after which he was downgraded to assistant professor at the Faculty of Philosophy.

Political situation after the war was not favourable. Despite all adversities, Radovanović was appointed full professor at the Faculty of Natural Sciences and Mathematics, and elected into the Serbian Academy of Sciences and Arts as corresponding and then full member, in 1958 and 1968 respectively. From 1954 he was an honorary member of the Academy of Zoology in Agra, India. Besides, he was a member of many foreign and Yugoslav scientific societies. Radovanović acquired world fame in the fields of evolutional biology, systematics, faunistics, and comparative morphology of amphibians, reptiles and Trichoptera.

He wrote many books and textbooks, and scientific papers and monographs that appeared in most reputable foreign journals and academic institutions. He described over 20 taxa of lizards *(Podarics melisel-lensis, P. sicula),* of newts *(Triturus alpestris, T. cristatus)* and Trichoptera *(Wormaldia)*. Some life forms, in honour of Prof. Radovanović, were named after him. His works are quoted today as they were during his life-time. His doctoral dissertation defended in 1928 is still referred to by many scientists.

Radovanović was a tireless explorer of nature and traveller. Unfortunately, during one international field expedition to Africa's south, he tragically lost his life in an airplane accident at Ondakaremba airport in Namibia, in April 1968. Few months later, his remains were laid to rest at the New Cemetery in Belgrade.

Authors: *Džukić, Georg V.; Savić, Ivo R.*

Svetolik A. RADOVANOVIĆ (1863–1928)

Svetolik Radovanović belongs to the first generation of Żujović's students who devoted themselves to geology. His ability to perform easily and quickly any tasks he was assigned singled him out from the crowd and enabled him to confidently handle any kind of job: he was a state geologist in the mining administration, a university professor, the Head of the Mining Department of the Ministry of National Economy, Dean of the Faculty of Philosophy, Minister of Economy, academician, principal consultant of an important bank, etc. He did everything faultlessly and achieved some notable results.

Radovanović was born on March 3, 1863 in the village of Prćilovica near Aleksinac, on the family estate of a civil servant. He lost his mother early and spent his childhood following his father wherever his job took him. He attended primary school in Kučevo, Gradište and Kragujevac, and high school in Kragujevac and Belgrade. In 1881 Radovanović enrolled at the Natural Sciences and Mathematics Department of Belgrade University, where he took up geology as his main subject. With Žujović's support, he went to study paleontology and geology in Vienna, under Professors Neumayr and Suess. In 1891 he obtained his Ph.D. in paleontology, and geology with chemistry.

After returning to Serbia Radovanović worked, from 1891 to 1897, at the Mining Department of the Ministry of National Economy, conducting fundamental research and accomplishing his greatest results. In 1897 Radovanović was elected professor of paleontology at the University, where he worked until he retired, except for the 1904–1905 period, when he served as the Minister of National Economy. Radovanović's research into fundamental and applied geology was based on reliable paleontological documentation which enabled him to conduct a tectonic analysis of Serbia and the Carpathian-Balkan mountain chains.

His projects included explorations of artesian wells at Smederevo, Šabac, Obrenovac, Zaječar and Mladenovac, mineral water catchments, waterworks in Belgrade, Leskovac and Čačak. Also, based on his calculations and evaluations, railway tunnels were dug and collieries opened at Tresibaba, Soko Banja, Rakova Bara and in Kosovo.

Radovanović was, above all, a gifted educator, well loved by his students, who left a deep trace on our science, economy and university education.

Author: *Grubić, Aleksandar*

Danilo P. RAŠKOVIĆ
(1910–1985)

Danilo Rašković, a doctor of technical sciences, mechanical engineer and mathematician with a university degree, started the first scientifically based courses of mechanics at the Faculty of Mechanical Engineering in Belgrade. He also introduced courses on the subject of strength of materials, elasticity theory, and oscillation theory all of which he taught, too. He authored many textbooks of high scientific standard and large circulation. He introduced vector, matrix and tensor calculus in the studies of mechanics at the Faculty of Mechanical Engineering in Belgrade and, later on, did the same at the Mechanical Engineering Faculties in Niš, Kragujevac and Mostar. He enabled the Faculty in

Belgrade, and similar schools elsewhere, to produce highly qualified and educated engineers which was one his greatest contributions. He wrote the first university textbook in Serbia on oscillation theory presenting his original research results. He achieved considerable scientific success in the fields of elasticity theory and oscillation theory. With a good human resource base at Niš Faculty, which he had set up, Rašković started research work into the field of nonlinear mechanics. His scientific work is important because in all of his projects he succeeded in connecting theories of elasticity and oscillation, and engineering practice. Rašković produced 25 university textbooks which covered the entire field of mechanics and the related areas. Almost all of them have had several reprints, some even 20. His excellent textbooks were in use on the entire territory of the former Yugoslavia which, during World War II, was in tatters under the powerful influence of fascism. Thanks to Prof. Danilo Rašković, the faculties of mechanical engineering of Serbia, Bosnia and Herzegovina, and all the other republics of the once unified Yugoslavia which are now separate states, produced generations of excellent mechanical engineers. Rašković was a patriotic and honourable man. He was the recipient of *the City of Niš October Award* for his contributions to the development of science at Niš University.

This distinguished scientific figure of exquisite creative energy and inspired enthusiasm, a scholar deeply attached to the Yugoslav and Serbian scientific and cultural heritage, and an outstanding pedagogue of high moral principles is in the living memory of many generations of students whom he taught how to learn and love mechanics, as a basic scientific branch of mechanical engineering either directly, through his lectures, or through his various and numerous textbooks.. His followers and colleagues very much appreciated his great enthusiasm permeated with sincere devotion for mechanics and scientific eagerness which he passed on them.

Prof. Danilo P. Rašković was born in 1910, in Užice. After finishing elementary school and six grades of high school, he graduated from the Military Academy in 1930. As an engineering military officer he enrolled at the Mechanical and Electrical Engineering Department of the Faculty of Engineering in Belgrade, in 1933. Having graduated in 1938, he enrolled at the Theoretical Mathematics Department of the Faculty of Philosophy and graduated from it in 1941. As a graduate mechanical engineer he was appointed assistant Head of Section of the Military Technical Institute in Čačak, and he stayed there during 1941. In 1942 he was appointed assistant at the Faculty of Engineering in Belgrade where he obtained his Ph.D. defending his thesis entitled *Tangential Strains of Normally Profiled Beams* that same year.

In 1962 Prof. Rašković, as the Head of the Mechanics Department at the Institute of Mathematics of the Serbian Academy of Sciences and Arts, organized research work in four different study groups, each one dealing with a particular subject, namely: *Stability of motion* – supervised by Dr Veljko Vujičić, *Boundary layer theory* – supervised by Dr Viktor Saljnikov, *Problems of anisotropic incompatible materials with finite strain* – supervised by Dr Rastko Stojanović and *Optimal problems of mechanics* – supervised by Prof. Dr. Danilo Rašković.

During his university career, he was elected Vice-Dean of the Faculty of Mechanical Engineering of Belgrade University on two occasions. He was the first Head of the Mechanics and Automatics Department of the Faculty of Mechanical Engineering in Niš. He was an outstanding lecturer, scientist and practitioner much liked by his students and respected by his colleagues both as a professor and an engineer, for his ability to relate engineering theory to practice.

As a full professor he produced 37 pieces of scientific work that were published in scientific bulletins of the Serbian Academy of Sciences and Arts, Polish Academy of Science, German Society of Mechanics and some others. He attended a number of scientific meetings in the country and abroad. He edited articles that appeared in the world's four leading scientific periodicals: *Applied Mechanics Review* (USA), *Mathematical Review* (USA), *Zentralblatt fur Mathematik* (Germany) and *Referativnii žurnal* (Moscow). Rašković was a member of several professional and scientific associations in the country and abroad, the GAMM being one of them. He initiated the foundation of the Yugoslav Society of Mechanics in 1952. Out of his publications for postgraduate studies the *Analytical Mechanics, Theory of Elasticity and Tensor Calculus* deserve to be mentioned.

In 1974/75 he was arrested in Mostar, Bosnia-Herzegovina, and unjustly sentenced. Following the experience, he worked on new editions of his high-circulation textbooks, out of which the 10th edition of *Mechanics I* for university studies deserves a special mention as does the 15th edition of his handbook containing the strength of materials tables. Last months of his life he spent preparing his textbook *Elasticity Theory* for publishing. It came out in 1985 but he did not live to see it.

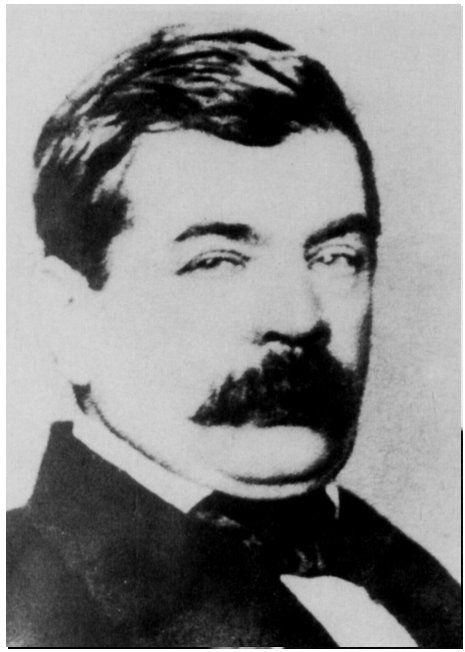
He died, unexpectedly, on January 29, 1985 in Belgrade.

Although it has been twenty years since he left us, Prof. Rašković is still present among new generations of students, and engineers, through his renowned textbooks that keep the memory of his achievements alive. The books have left an indelible mark on the development of mechanical

engineering. Many generations of university professors studied from them as students of Niš University are doing nowadays.

Rašković is an everlasting proof of how one's deeds can outlive one's physical existence.

Authors: *Stevanović-Hedrih, Katica; Studović Milovan*



Mihailo RAŠKOVIĆ (1827–1872)

The pioneering work of Mihailo Rašković laid the foundations for the development of chemistry in Serbia. Rašković studied technical sciences in Prague, natural sciences in Budapest and mining engineering at the academies at Chemnitz and Pzibram. As the first professor of chemistry at the Lycaeum (1853–1863) and Belgrade College (1863–1872), he introduced modern teaching methods of chemistry, inorganic and organic; and chemical technology and analytical chemistry. The syllabus of his lectures has been preserved together with and an unpublished manuscript on inorganic chemistry.

Setting up a chemical laboratory and introduction of exercises for students in the 1850s were of great importance for the history of che-

mistry. Rašković's well equipped laboratory, with twelve work units, was one of the first chemical laboratories of that kind in Europe. Beside student doing exercises in analytical chemistry, the laboratory was a place where Rašković performed analyses of mineral waters, forged coins, minerals, and many other chemical tests. Following his admission to the Lycaeum, Rašković was appointed state assayer of minerals and forged money, and in that capacity he conducted chemical analyses and tests for various ministries and institutions.

Rašković helped equip the natural science section of the laboratory by furnishing it with a collection of specimens of minerals and shells which he had gathered on his travels around the country. He set up a chemical library in 1868; bought seven books to start it but then acquired more every year after that. For many years, Rašković, who graduated from a famous mining academy, worked as a mining engineer. In summer he travelled around Serbia studying geology, visiting mining centres, working on mining legislation and attending to other matters aimed to promote Serbia's mining industry.

Rašković was the first chemist to address problem of technical terminology. Most of the terms he introduced were subsequently retained by Lozanić, and have entered the mining terminology in this country. He was a member of the Serbian Literary Society and the Serbian Learned Society. At the end of 1866, he was elected president of the Natural Sciences Division of the Serbian Learned Society.

By setting up a chemical laboratory and introducing practical exercises in education, at a time when such laboratories were only beginning to emerge in Europe, Rašković joined a group of learned men whose individual efforts helped bridge several centuries of scientific and educational development, and catch up with progressive trends in Europe.

Author: *Bojović, Snežana*

Nikola SALTIKOV
(1872–1961)

Nikola Saltikov was born in Višni-Voloček, County Tver, Russia. He completed his studies at Harkov University in 1895, and obtained his M.A. degree in 1898. He was a student of A.M. Liapunova and V.A. Steklova. He defended his doctoral thesis in mathematics in 1905, and in 1906 he became professor at Harkov. At the end of November 1919, when the Bolshevik Revolution broke out, Saltikov left Harkov and went to Caucasus in Georgia, where he was appointed professor of theoretical mathematics at the Georgian National Institute in Tiflis. He soon left Russia. On June 14, 1921, the Ministry of Education of the Kingdom of Serbs, Croats and Slovenes appointed him part-time professor of mathe-

matics at the Philosophical Faculty, University of Belgrade. On June 25, 1930, by King's decree he was appointed full professor.

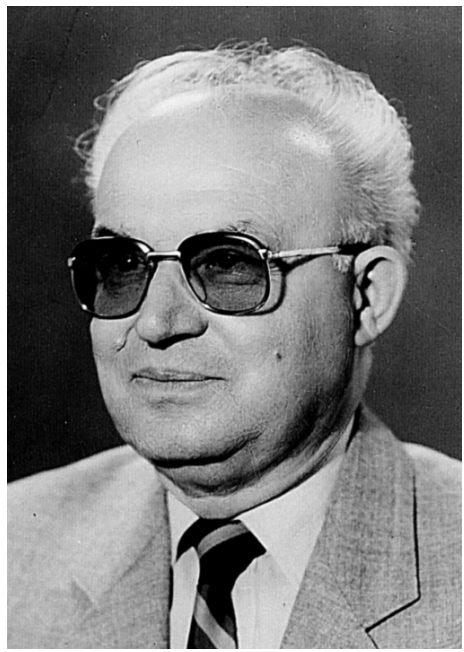
Prof. Saltikov was interested in problems of theory of partial equations, differential equations, geometry, and mechanics. He had about 300 bibliography entries. He wrote a number of studies, monographs and textbooks. His texts appeared in Paris, in a well-known monograph *Memorial des Sciences Mathematiques* prepared by French and other foreign mathematicians. His 748-page book *Methods of Integration of Partial Equations of the First Order with One Unknown Function,* published by the Serbian Academy of Sciences and Arts, Belgrade, 1947, is a voluminous study on partial equations. This work embraced fifty years of his experience and research activities. Saltikov attended many Yugoslav and international congresses. In 1934, he was elected corresponding member of the Serbian Royal Academy, and in 1946 full member of the Serbian Academy of Sciences and Arts.

Many great mathematicians of his time were Prof. Saltikov's idols: on one side there were the Russians scientists A.M. Liapunova, V.A. Steklova, V.P. Ermakova, and on the other the famous French, German and other mathematicians of the 19th century, namely Cauchz, Bertran, Poissou, Jacobi, Sophus Lie, Monge. His enormous knowledge of partial equations helped him in his research work and he introduced the concept of *characteristic function*. He simplified Jacobi's theorems on canonical differential equation systems. Saltikov discovered classes of equations with variable separation. He proved that S. Lie's integrals were certain formal generalization of all other integrals.

Saltikov offered universal solution for partial equations with more then two variables represented by Lie's integrals. Using Monge-Ampere equations he produced a series of supplements. Besides his own studies and research of mathematical issues, he also taught a number of specialized courses.

Future generations are greatly indebted to Prof. Saltikov, who spent nearly 50 years actively and enthusiastically performing his scientific and pedagogical duties at Belgrade University.

Author: *Knežević-Miljanović, Julka*



Miloje R. SARIĆ
(1925–2002)

Miloje R. Sarić was born on September 12, 1925 in the village of Nemenikuće, near Sopot, into a peasant family. His father's first name was Radojica, and his mother's Leposava (née Životić). He finished elementary school in his native village and grammar school in Belgrade. He enrolled at the Faculty of Agriculture and Forestry in Belgrade-Zemun in 1946 and completed the studies within three and a half years. His first job was with the Institute for Agricultural Investigation in Sarajevo, the Agrobotanical Department, where he stayed until 1951. From 1951 he worked at the Federal Development and Plant Production Institute in Zemun Polje. Although his job was to work on plant development, he was

interested in problems of plant physiology from the very beginning. In those days plant physiology was not a scientific discipline at the Institute, but prof. Sarić, nevertheless, presented his first papers on the subject. He spent seven months in the United States, and six months in the USSR, specializing in his area of interest. During the time spent abroad, especially in the USSR, his interest in plant physiology grew even bigger. He personally chose the title of his doctoral thesis form the field of growth and development of plants**.** The thesis, entitled *Effects of Seeds, From Different Stages of Ontogenetic Development, Their Physical Traits and Some External Factors on the Growth and Development of Small Grain Cereals* was defended at the Faculty of Agriculture in Zemun in 1957.

He started working at the Institute for Agricultural Investigations in Novi Sad where he founded the Department of Plant Physiology in 1958 and was its Head until 1970. In 1961 he was elected part-time professor for the subject of plant physiology and full-time professor in 1968. He was director of the Biological Department at Novi Sad University, from 1971 to 1974, during which time he greatly helped its building.

Scientific activities of professor Sarić covered various fields of plant physiology, such as growth and development, which resulted in his first paper on the subject *Effect of Absolute Mass of Seed on Number of Primary Roots in Wheat.* His scientific interests also included radio-physiology, photosynthesis and physiology of mineral nutrition, and particularly one of its parts - genetic aspect of mineral nutrition of plants.

As well as working in the field of plant physiology, toward the end of his career professor Sarić devoted his time to doing research work. As the editor of a bulletin published by the Serbian Academy of Sciences and Arts, he paid significant attention to the works of Serbian scientist, medicinal plants of Serbia and the flora of Serbia. He authored and co-authored 209 papers and 23 books.

His scientific papers were published into different languages: Serbian, English, Russian, German, Italian, and Slovakian.

Professor Sarić's greatest contribution, apart from the above mentioned, was in the field of plant mineral nutrition. The problems studied can be divided into three groups: a) effects of biotic and abiotic factors on the intake, content and metabolism of some ions, b) genetic aspects of plant mineral nutrition, c) problems related to atmospheric nitrogen fixation in leguminous (*symbiotic fixation*), and non leguminous (*asymbiotic fixation*) plants.

In dealing with problems of genetic aspects of plant mineral nutrition, professor Sarić achieved significant results that earned him great affirmation in the world's scientific community. Along with studying

plant physiology, academician Sarić devoted himself to research work i.e. establishing criteria and standards for comparing scientific contributions in a particular field.

His contribution to the study of historiography of our science, and the works and deeds of Serbian scientist with the aim of protecting them from sinking into oblivion, was momentous. He initiated the founding of the Board for investigation of the lives and works of Serbian scientists and scientists of Serbian origin living outside Serbia.

As the Board president he organized and coordinated the working of the Board, wrote texts and edited eight books of the major edition *The Lives and Works of Serbian Scientists.*

He was the manager of the Board for investigating the flora and vegetation of Serbia from 1981, and he contributed greatly to the creation and publication of 10 volumes of *Flora of Serbia*. He was also the editor of *Vegetation of Serbia* and *Medicinal Plants of Serbia*.

Professor Sarić is greatly respected in the world, and especially in our country, for his research work as a scientist. It was him who initiated the founding of the Yugoslav Association of Plant Physiology that gathered scientists which studied plant physiology. He assisted young associates and scientific workers and helped their professional development.

His involvement in the solving of practical matters in the field of plant production, the subject on which he had a great number of expert papers published, was remarkable. His contribution in the filed of mineral nutrition of wheat, and other cultivated field plants, was even greater.

Besides doing research work he also taught. He tried to make students and young researchers interested in plant physiology and a great number of final examinations for university degree (148), M. Sc. thesis (17), Ph.D. thesis (15), as well as published books stand to prove it.

Prof. Miloje R. Sarić became a corresponding member of the Academy of Sciences and Arts in 1978 and its full member in 1988. He was a very active and successful Academy member, with the leading role on three of the Academy's boards: Board for studying flora and vegetation of Serbia, Board for biomass and Board for studying the lives and works of Serbian scientists and scientists of Serbian origin outside Serbia.

Professor Sarić was the Yugoslav representative at IAPP (the International Association for Plant Physiology) in 1973, and he also represented the Yugoslav Association for Plant Physiology at FESPP (the Council of European Federation for Plant Physiology) in 1978. He served two terms of office as the president of the Yugoslav Association of Plant Physiology.

He received several awards and honours for his exceptional scientific, educational and organizational achievements**.** Some of the rewards are listed below:

– 1960 – *the 7th July Award* (presented by the Executive Council of the SR Serbia)
– 1964 – *the city of Novi Sad October Award (*collective)
– 1965 – *the Medal for Labour with the Golden Wreath*
– 1986 – the *AVNOJ award*
– 1990 – *the Novi Sad University Charter With The Silver Placard*

It should be emphasized that he was one of the few scientists which received *the AVNOJ Award,* the highest honour in the former Yugoslavia. He earned it for his contributions in the field of biology – plant physiology in particular.

Professor Miloje R. Sarić died on December 6, 2002 in Belgrade, at the age of 78.

Authors: *Kastori, Rudolf; Krstić, Borivoj*

Dimitrije SAVIĆ
(1898–1981)

Academician Dimitrije Savić was born on September 29, 1898 in Belgrade where he spent his entire life. He died in 1981, nearly 83 years old. His parents were Milutin and Danica Savić. Savić completed primary and secondary school in Belgrade, and in 1919 he enrolled at the Mechanical and Electrical Engineering Department of the Technical Faculty, Belgrade University. After graduation in October 1923, he joined the Navy and completed 9 months of military service.

On January 12, 1925 Dimitrije Savić obtained his first job at the Belgrade Electric Power Station. In November 1926, however, he was appointed head of a new construction branch. In March 1928 he became

manager of the Mechanical Department, and from January 1, 1930 he was director of the overall Mechanical Services. Among many different tasks, such as management of electricity production and construction works designs, he was in charge of new boiler plants and supervised construction of furnaces which used lignite for fuel in order to improve burning performances and efficiency.

From November 1, 1931 Dimitrije Savić worked as the technical manager at *Power and Light Company* in Belgrade. At that time, this power plant was among the most advanced in Europe and enabled Savić to pursue serious scientific research on lignite combustion and chemical properties of water used in steam boilers, which was not done even in more industrialized countries. He worked there until July 15, 1945, when the Serbian Ministry of Industry and Mining appointed him technical manager of the newly established Electric Power Company of Serbia. By the Ministry's decree, on November 26, 1946 Dimitrije Savić was appointed deputy director of the State Electrification Company. He was very involved in the creation of the first five-year-plan of electrification of then Yugoslavia.

In 1948 the infamous Informbiro Resolution of the Eastern Block countries stalled the delivery of the already contracted equipment for the new power plants in Yugoslavia, and so the Federal Ministry of Energy Supply sent Dimitrije Savić to the USA to negotiate the possibilities of purchasing the equipment form the West. At the beginning of 1950, the Government Committee for Energy Supply appointed Dimitrije Savić manager in charge of construction of the *Veliki Kostolac* thermal power plant, 4 x 12.5 MW; the largest in Serbia and one of the first in Europe to use low calorie coal-lignite as the main fuel.

On October 7, 1950, by a decree of the Federal Government of Yugoslavia, Dimitrije Savić was named director of *Termoelektroprojekt*, the Federal Bureau for design of thermal power plants within the Ministry of Energy Supply. After the Bureau was restructured into four regional bureaus in the mid-1951, Dimitrije Savić was appointed director of the Bureau for thermal power plants within the newly founded *Energoprojekt Company* in Belgrade. He worked for them from September 29, 1951 to March 31, 1960.

Along with his professional and scientific engagements, Dimitrije Savić was also active at University. He was appointed full professor at the Faculty of Mechanical Engineering in 1960, although he had already been working as assistant professor at the Technical Faculty, as it was known in those days, from 1926. He also taught students at the Electrical Engineering Faculty from 1948, and was appointed full professor there in

1957. He was active at the Electrical Engineering Faculty until 1962 and the Mechanical Engineering Faculty by 1973, even after he retired. Prof. Dimitrije Savić received honorary Ph.D. from the University of Belgrade on November 15, 1971.

The Assembly of the Serbian Academy of Science and Arts held on December 17, 1959, elected Dimitrije Savić a corresponding member, and on March 7, 1968 as full member. Between June 1971 and May 1977, Academician Dimitrije Savić was Secretary of the Technical Sciences Branch of the Academy, and remained a member of the Presidency of the Academy until the end of his life. In that capacity, he initiated and chaired three major symposia organized by the Academy (1968, 1971 and 1974) and dedicated to solving of problems of energy development in Yugoslavia. Conclusions of these symposia were of an extreme importance for the long-term energy planning in Yugoslavia.

Academician Dimitrije Savić died at the age of 85, after six decades of a fruitful career as a scientist. He actively participated in the planning, construction and exploitation of thermal power plants in his country and focused all his potentials to solving technical problems connected to their operations. Many generations of professionals will remember his original solutions regarding utilization of domestic lignite in generating electricity. During his lifetime, the unit capacity of thermal power plants in Yugoslavia increased from 1 MW to 600 MW while their overall efficiency rose from 10% to over 30%, with Savić greatly contributing to it with his extraordinary knowledge and experience.

Author: *Mesarović, Miodrag*

Pavle SAVIĆ
(1909–1994)

Pavle Savić was born in 1909, in Thessaloniki, Greece, where his father Petar was a veterinarian in charge of Serbian cattle exports. He spent his youth in Serbia (later Yugoslavia) and studied at Belgrade Philosophical Faculty (1927–1932) majoring in physical chemistry.

In 1935 he won a French scholarship, and he joined the *Institute de Radium* in Paris, where he worked for Irene Joliot-Curie on elucidation of the origin of radioactive products of neutron irradiation of uranium. From a mixture of different radioactivities they isolated one with a half life of 3.5 hours, named *R xsi*- It did not follow the expected chemical behaviour of transuranium elements. At first the likeness to actinium was deter-

mined but after adding lanthanum as the carrier, they discovered that R_{35h} did behave like actinium *and could be separated from it only by fractionation*. The German radiochemists Hahn and Strass-mann, in an attempt to invalidate this *impossible* finding, repeated the experiment only to confirm that two radioactivities were the isotopes of barium and lanthanum, thus discovering fission. (The caution in the experiment of Joliot-Curie and Savić was caused by the presence of an yttrium fission product which incidentally also has a half life of 3.5 hours).

When World War II started, Savić returned to Yugoslavia, to join the partisan liberation movement in 1941. He was the only encoder at the movement's center of operations. By the end of the war in 1944, Savić was transferred to Moscow where he worked at the Physics Institute of the Academy of Sciences. He expected to work in the field of fission, but was assigned to solve problems of the behaviour of liquid helium.

After returning to Belgrade in 1948, Savić became the founder and first scientific director of a research institute, later named *the Boris Kidrič Institute of Nuclear Sciences*. Soon the Institute became quite successful. At first, Savić interested revolved around radiochemistry, analytical chemistry of uranium, crystallochemistry, and isotope separation.

Savić left the Institute in 1960, to join the Faculty of Science of Belgrade University, where he headed the Department of Physical Chemistry. He retired in 1966. From 1961 on, Savić's scientific interest focused on the theory of matter behaviour at high pressures, known as the Savić-Kašanin theory. The theory deals with the expulsion of peripheral electrons from atoms at extremely high pressures, such as in the interior of celestial bodies, predicts stratification in the planet's interior (without necessarily assuming differing chemical compositions), and explains the origin of the body rotation, its magnetic field, and internal temperature.

Savić was elected into the Serbian Academy of Sciences and Arts in 1946 and held office as its president for three terms. He was a corresponding member of the Academy of Sciences of the USSR, and Hungarian and Athenian Academies. He was the recipient of the highest Yugoslav honours, and on two occasions received *the French Legion of Honour Medal.* He was also awarded *the Rutherford Medal*, *the Lomonosov Gold Medal*, *the Kurnakov Medal*, *the Mendeleyev Silver Medal*, *the City of Paris Silver Medal*, and many more.

Pavle Savić died in Belgrade, in 1994.

Author: *Ribnikar, Slobodan, V.*

Todor – TOŠA F. SELESKOVIĆ (1856–1901)

Todor Selesković was born in Belgrade, in April 1856, into a family of settlers from Austria and Germany. He completed elementary school and a few years of high school in Belgrade, and then continued his studies at the Secondary Technical School in Frankenberg (Saxony). In 1879 he graduated mechanical engineering from the Baden Polytechnic School in Karlsruhe (Germany). Up until the end of May 1881, he was involved in the construction of special machine tools at the Lorenz Metallpatronen Fabrik in Karlsruhe, at which time he returned to Serbia, where for the next eleven years he was employed as a mechanical and civil engineer in the Military Engineering Works in Kragujevac. Here he helped develop

new production programmes and design new workshops and factory halls, as well as a variety of machines and equipment. The factory was one of the first in Europe to receive electric lighting, thanks to Selesković, and he was also instrumental in reopening the apprentice school.

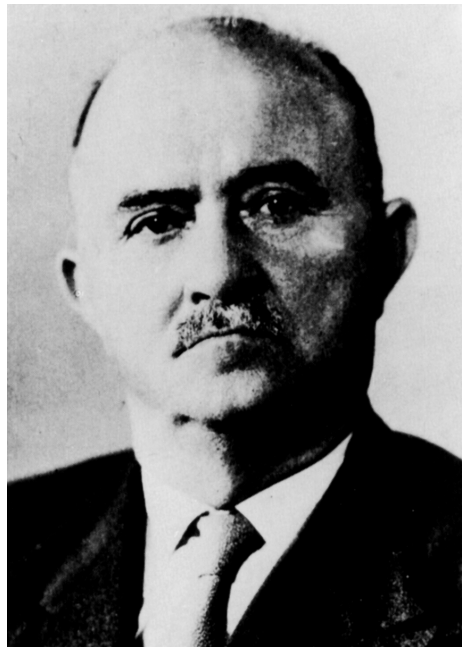
In 1892 he moved to Belgrade where he became the first director of the Belgrade Waterworks Department, and from early 1895, until his untimely death in Kragujevac at the beginning of 1901, the first professor of mechanical engineering at Belgrade College.

In Kragujevac he constructed first machine tools in Serbia, which received high international acclaim at the World Exposition in Paris in 1889, and also the first hydraulic turbines. He was a co-founder of the Serbian Engineers Association in 1890, and for many years its president or Vice-President. As a Member of Parliament, he spoke in favour of promoting industrial development in Serbia. Working on a number of engineering projects, he became a great champion of *scientific* as opposed to *trial-and-error* engineering and technology (in order to draw the proper distinction, he expanded the concepts of *manganism* and *naturism* introduced by the German Prof. F. Reuleaux). He was regarded as the leading authority on engineering science and technical know-how in his day. Besides, Selesković was also one of the first scientists in Serbia who relied on his own scientific research and analyses in attempts to resolve new and complicated technical problems.

While still in Germany, he joined researchers investigating the possibility of manufacturing cartridges out of steel instead of bronze, and his practical determination of optimal cutting speed is one of the earliest tests in machinability carried out in the world and has since been used to improve the construction of machine tools. In his address delivered on the occasion of being elected professor at Belgrade College, he elaborated upon the ideas of *manganism*, offering as an example the Kragujevac Military Engineering Works, and in an essay on the ceramics industry in Serbia he presented results of scientific analysis of all relevant factors which resulted in a proposal for a best possible production programme.

Todor Selesković wrote over thirty scientific and technical articles which appeared in the *Serbian Engineering Journal* and in other publications.

Author: *Šolaja, Vladimir B.*



Čedomir SIMIĆ
(1896–1969)

Academician Čedomir P. Simić was born on June 28, 1896 in Čumić, a village in Šumadija, near Kragujevac. He completed elementary school in his birth place, and Grammar School in Kragujevac and Niš. His education was interrupted in autumn 1915, when, together with the Serbian Army he retreated across Albania. He fought at the Thessaloniki front from 1916 to 1918. After the war he finished Grammar School in Thessaloniki. Serbian Government used to send most promising young intellectuals to study abroad in those days. Simić was awarded a state scholarship and so he enrolled at Medical School in Rome, but was soon expelled from Italy, together with other Serbian students, because of his

active participation in protests against the Italian irredentist politics. He continued his studies of medicine in Paris in 1918, but in 1920 he moved to Medical School in Strasbourg. There, in January 1923, he obtained his doctoral degree with the highest grades. Having returned to Belgrade, Simić was sent to the Hygiene Institute in Skoplje, the Bacteriology and Malariology Laboratory. He was granted a Rockefeller Foundation scholarship for post graduate studies, and in 1925 he returned to Paris. Simić spent a whole year working in laboratories at the Pasteur Institute and Paris Medical School, studying tropical diseases under the eminent Prof. E. Brumpt. He returned to Skoplje in 1926, and was appointed Head of the Hygiene Institute. In the beginning of 1934, Simić was appointed Director of the Institute of Hygiene, where he remained until the end of 1936, when he was elected professor of parasitology at the newly established Veterinary School in Belgrade.

The Skopje years were filled with great enthusiasm of the young doctor Simić, and during that fruitful period he studied malaria, amebiosis, trihomonosis and mosquito fauna as well as protozoa of humans and domestic animals. Simić's new position at Veterinary School in Belgrade presented him with new challenges: he had to organize work, purchase equipment for the Institute of Parasitology, run the new school. He paid particular attention to education of students of medicine and veterinary medicine. His first textbook on parasitology was published in 1939, the second one in 1940. In his research he addressed problem of parasite fauna of humans and domestic animals. During the German occupation, the University closed and Simić spent those four years in his native village, providing free medical treatment to his countrymen.

In 1944 Belgrade was liberated and Simić returned to town. He immediately set out to help the reconstruction of partially damaged Medical School premises. During academic 1947/48 he was Dean of Medical School, in 1954/55 president of the Council of the same school. He was elected corresponding member of the Serbian Academy of Sciences in 1948 and full member in 1950. In 1947 he founded the Institute of Parasitology within the Serbian Academy of Sciences, and was its Head until his retirement. In 1945 Simić and many of his assistants started systematic research of visceral leishmaniasis and phlebotomin fauna in Yugoslavia. He also investigated protozoa and helminth among school children all over Yugoslavia and further investigated coccidiosis in domestic animals and trihomonadidea in humans and domestic animals. Simić's research activities included studies of piroplasmosis in cattle and sheep, and the tick fauna of our country. The results were invaluable. He also conducted thorough research of echinococcosis, and from 1954 on,

Simić studied, with outmost attention, toxoplasmosis, its epidemiology and epizotiology, ways of its transmission and premunition of this disease.

Academician Čedomir Simić held office as president of the National committee of echinococcosis and of the Committee of echinococcosis – Office internatinal d'Epizoties – in Paris. He was also president of the National Committee for Eradication of Malaria. He lived to see that terrible disease eradicated from our country, which was published in an official statement by the World Health Organization (WHO). For a number of years he presided over, and lectured at, many international seminars in Belgrade organized by the Federal Administration for Health Protection and the World Health Organization.

During his life-time, Simić published (as author or co-author) six textbooks, three monographs and 200 scientific papers in national and international scientific journals. At his institutes, over 60 veterinarians, physicians and biologists successfully completed their specializations in the area of parasitology, and 48 candidates successfully defended their doctoral dissertations.

Simić enjoyed great reputation in our country and abroad, and received highest honours for his achievements. He was an honorary member of many foreign professional associations such as the French Academy of Veterinary. He was decorated with *the Order of St. Sava*, and received the *French Legion of Honour Medal*. Also, in December 1967, he received the highest honour of the Yugoslav state – *the AVNOJ Award.*

The name of the academician Čedomir Simić, one of the founders of parasitology and experimental parasitology in our country, will be preserved in the histories of the School of Veterinary Medicine, Belgrade University, the Serbian Academy of Sciences and Arts, and many other scientific and research institutes of our country.

Author: *Petrović, Zlatibor*

Siniša Dj. STANKOVIĆ
(1892–1974)

Academician Siniša Stanković was born in Zaječar, Serbia, on March 26, 1892. In 1910 he enrolled at Belgrade University, but his studies of biology were interrupted in 1914 by World War I. He joined the Serbian Army as a volunteer of the Danubian Artillery Regiment. In 1915, he arrived in Grenoble (France) via Ohrid and the island of Corfu together with a group of students. He received his B. Sc. degree in 1918 and earned his Ph. D. title in 1921. He started work, the same year, as an assistant at the Faculty of Science, Belgrade University, and was promoted in 1934 to university professor, and elected associate member of the Serbian Academy of Sciences and Arts. He dedicated most of his life to science

and performed his duties with enthusiasm to the end. It was the same kind of passion for scientific work and deep patriotism which mobilized all his capacities and directed his efforts towards helping the development of the country.

He lived in an era of extraordinary and revolutionary scientific developments, especially in the field of biology. Stanković took part in these events and incessantly insisted on implementing new ideas and achievements into both, current science and everyday practice. These ideas were permanently present in his publications and lectures given to the University students, fellow scientists or general public. He was strictly against idealistic and reactionary approaches to interpretations of the relation between an organism and its environment, particularly criticizing geographical determinism.

Stanković was an extraordinary observer of natural phenomena with a superior ability to unearth deeper biological connections between them, as well as to provide evidence of complex interrelation of organisms and their environment. His concept and interpretation of living organisms as highly integrated systems, formed during complex processes of evolution, are particularly important. His papers on the problems of speciation are equally outstanding.

Fresh water organisms were the main topic of Stanković's research. His Ph. D. thesis considerably expanded the knowledge of the morphology and diet of the *cyprinid fry*. He also described new species of parasitic *coccidians* and worked on their systematics and distribution. Stanković published several papers on the hydrography of the lakes of Ohrid, Prespa and Skadar. His papers on *Planarians* of the Balkan Peninsula, Tertiary relict *triclads* in Lake Skadar and the West Balkans, and zoogeographical problems of these regions are of special significance. He explained irregularities in distribution of *Planaria alpina, Polycelis cornuta* and *Planaria gonocephala* in the head waters and the river mouth as being the result of formation of the species *Planaria montenegrina* (*Crenobia*) which appeared in preglacial era and replaced the species *Planaria alpina* and *Polycelis cornuta.*

Stanković was particularly interested in Lake Ohrid and its endemic and relic species. As the initiator and organizer of research studies of the lake's fauna, he concentrated his investigations onto its ecology and distribution, analysing the history of the Balkan's fresh water fauna. His results shed new light on some important aspects of the history of the fresh water fauna in Yugoslavia and other parts of the Balkan Peninsula. These biogeographical studies, supported by geological and geomorphological data, exceed the regional limits and represent a significant contri-

bution to the world of science, thus linking the name of Prof. Stanković to the theories that are still accepted all over the world.

All his investigative works focused on ecology which was, at the time, a young science undergoing rapid development. In his popular book on ecology, entitled *Framework of Life* which appeared as early as 1933, he put forward the basic principles of ecology and saw the relationship between the men and the environment as it was. The complete opus of Prof. Stanković makes him the founder of ecological sciences in Yugoslavia. He was the first President of the Yugoslav Ecological Society.

In theoretical papers, he criticized the mechanistic approach and vitalism, elaborating on the specific type of organization which does not exist in the inorganic nature, and provides essential foundation for structural and functional integrity of living systems. His papers on the levels of biological organization form subindividual level up to the biosphere are the most appreciated articles of that kind. Insisting on a team work and interdisciplinary approach to biological problems, he gathered different scientific groups around the new Biological Institute which, under his management, became Serbia's renowned scientific center. In his honour, the Institute bears his name and is now known as the *Siniša Stanković* Institute of Biological Research.

Although active as the President of the Serbian Parliament, he found time to work on the restitution of the University, and help reinstate teaching and research work. In the beginning, he taught almost all zoological courses, but evolutionary biology and ecology remained his favourite subjects. His charm, unique wit, deep interest in culture and science, made a lasting impression on anyone who came in contact with him. An impressive number of dissertations completed under his mentoring is the best proof of his concern for young scientists. This created an opportunity for transforming the wealth of his ideas into a source of valuable scientific data.

As previously mentioned, he was engaged in many other public activities. Apart from setting up the institutes in Belgrade and Ohrid, he campaigned for the founding of similar institutions in other parts of the country, e.g. the Institute of Oceanography and Fisheries in Split, the Institute of Marine Biology in Kotor, and the Biological Station at Lake Skadar, the latter two being for a short time under his administration. Stanković had another great passion besides biology and that was classical music. He was a very good flautist and pianist.

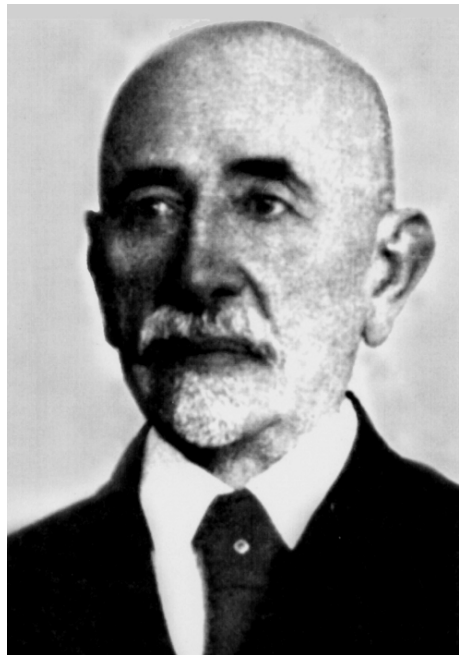
In1941 Stanković was taken prisoner and sent to Banjica concentration camp. He was released at the end of 1942 by the enemy authorities but was arrested again in 1943 when his planned transfer to the liberated

territory was deterred due to a *leak* from the Belgrade Communist Party. In 1944, again, Stanković was sent to Banjica as a convicted prisoner, accused, among other things, of criticizing the German regime in his book *Living Space* (*Lebensraum*). He managed to escape from the camp just before Belgrade was liberated and was elected the first President of the People's National Front. Stanković was soon elected President of the Antifascist Council of the National Liberation of Serbia, *i.e.* the President of the Presidium. After the first elections in 1945, and constitution of the National Assembly, he was appointed its President and on behalf of Serbia's delegation he read a public statement on abolition of monarchy and proclamation of the republic. He held office of the President of the Presidium of the Socialistic Republic of Serbia for two terms, and in that capacity attended the Peace Conference in Paris. He was also the first President of the Yugoslav UNESCO Committee.

Stanković received many honours and medals for special merits and scientific achievements, such as *the Einar-Naumann Medal*, and the *AVNOJ Award*, the highest Yugoslav decoration. He was appointed honorary doctor of science at the Universities of Grenoble and Nancy (France) and was a member of science and arts academies of all former Yugoslav republics, and abroad.

As a true humanist, he was a modest man deeply concerned about his associates, especially young researchers. He encouraged and supported them on their *thorny voyage* through the world of science and genuinely rejoiced in their success.

Authors: *Todorović, Maksim; Popović, Ranka*



Aleksa M. STANOJEVIĆ (1865–1959)

Aleksa M. Stanojević, educator, scientific and public activist, mountaineer, journalist and translator, was born on April 26, 1865 in Čačak, into a craftsman's family. He completed elementary school and lower classes of the secondary school in his native place, and higher classes in Kragujevac, where he passed his final examination. From 1883 to 1887 he studied at the Faculty of Philosophy, Natural Sciences and Mathematics Department, in Belgrade. He was especially interested in geology and chemistry, but also in philosophy. He became a member of the Radical Party while still a student.

From 1887 to 1910 Stanojević taught natural sciences, geology and chemistry at high school in Čačak, Zaječar and Belgrade. In 1891 he successfully passed his professorial examination. From 1891 to 1893, in Paris, he studied secondary school education system and curriculum of natural sciences. He retired in 1898, for political reasons, but in 1900 he resumed his teaching duties at the Second Belgrade Grammar School. During the 1910-1911 academic year, he was the Principle of High School in Leskovac, and from 1911 until his retirement, he was inspector of the Ministry of Education. Stanojević was a World War I refugee in France (Marseilles, Nice, Grenoble and Aix-en-Provence) where he took care of our secondary school students. Following invitations by many French societies, he delivered lectures on national and political issues. For a period of time he was director of the Serbian Merchant School in Aix-en-Provence.

Between his second retirement and the beginning of World War II, Stanojević was active in public affairs. As a deputy and a member of the Technical Committee of Belgrade Municipality, he helped solve many technical problems affecting the capital, never neglecting his teaching practice at which he was very successful.

Aleksa Stanojević was the founder and a respected member of the Serbian Teachers' Society, (1888), the Serbian Geological Society (1891), and the Serbian Chemical Society (1897) and regularly attended their meetings until 1956.

He was an intellectual, and a very prolific one, who wrote and published 118 papers, books and essays on a variety of subjects. As a scientist he was involved in geology (regional, petrography and mineral chemistry) and chemistry (problems of Serbian chemical terminology and history of Serbian chemistry), and also initiated the development of our technical petrography and history of chemistry. Stanojević's pedagogical opus is equally impressive. He produced eight exceptional textbooks on geology, mineralogy and chemistry for secondary school students. Some of them had several reprints and were in use for many decades. In his studies and articles he addressed theoretical issues pertaining to secondary school education and method of teaching natural sciences. He was very critical about the education system in those days.

His fellow mountaineers rightly pointed out that Aleksa Stanojević was the founder of the organized mountaineering movement in Serbia. He campaigned for the setting up of the first Mountaineering Society of Serbia in Belgrade in 1901, and was its first vice president, active member and a real enthusiast.

Stanojević was also an author who produced interesting memoirs and journey essays, and also translated literature (*The History of a Young Man*, by M. Robert Halt, and *Nabob* by A. Dode).

After a short illness, this energetic, highly respected and above all a noble and gentle man died in Belgrade, on November 21, 1959, at a very old age.

Author: *Grubić, Aleksandar*

Djordje M. STANOJEVIĆ (1858–1921)

Djordje Stanojević, physicist, astronomer and professor of physics, was a co-founder of the science of astronomy and physical photometry in Serbia. He was also the founder of the Serbian electricity utilities. His major contribution was in the field of spectral analysis of the sun's radiation.

Djordje Stanojević was born on March 7, 1858 in Negotin, the Principality of Serbia. He completed elementary and secondary education in Negotin and Grammar School in Belgrade. He graduated from the Faculty of Philosophy, the Natural Sciences and Mathematics Department of Belgrade College, in 1881 (the section for the study of physics,

mechanics and astronomy). The same year he was appointed assistant at the Physics Department; in 1883 was elected professor at the First Belgrade Grammar School. Stanojević was awarded a state scholarship from the Ministry of Military Affairs and he specialized in astronomy, physics and mathematics at Berlin University, the Astrophysical Observatory in Potsdam and the Central Meteorological Station in Hamburg, 1883–1887. He worked for three years at the Sorbonne in Paris, and the Astrophysical Observatory in Medon, under astrophysicist Janssen, Pierre Jules Cesar (1824–1907), studying problems of the physics of the sun. Subsequently, he worked at the Greenwich Observatory, the Physical Institute at Cambridge, the Pulkov Observatory in Russia, and the Kew Meteorological Institute, England.

In recognition for his scientific achievements (particularly important was his study of spectral analysis of the sun's radiation), the French Academy of Sciences elected him representative of the Paris Observatory in Russia. He joined the 1887 French expedition which went to Petrovsk, Iiaroslavnya County, to study the sun's eclipse.

In 1889-1890, by invitation of the Paris Observatory, Stanojević joined an expedition which went to study the sunlight spectrum in the Sahara. He also attended international congresses on the physics of the sun (Paris, 1889) and the sun electricity (Paris, 1903).

From 1887 to 1893 Stanojević taught physics and mechanics at the Military Academy in Belgrade, and experimental physics at Belgrade College, from 1893 to 1904, when it become Belgrade University. He served as Rector of Belgrade University from 1913 to 1921. He died in 1921.

Stanojević was the Head of the Physics Institute and the Observatory of Belgrade College, from 1893 to 1921. He was mostly preoccupied by sun's radiation. He was a friend of Nikola Tesla for many years and was involved in the process of electrification of Belgrade. Thus, Belgrade became one of Europe's first towns which had an alternating current power-plant in 1893. Stanojević supervised the construction of a thermo-electric generating plant in 1893. He designed and constructed the first hydro-power plants in the country (Đetina, Čačak, Gamzigrad, 1913); organized maintenance service for electro-engineering industry in 1893; participated in electrification of various industrial plants, such as textile and hemp processing factories (Užice and Vučje). The first radio broadcasting station in Belgrade was also built by Prof. Stanojević, at the turn of the 20th century, based on Tesla's *resonant tuning of double receiving and emitting circuits* and he brought the first X-ray machine to Serbia.

Stanojević advocated the introduction of the metric system in Serbia and explained its advantages in many lectures which he organized for general public. He was the pioneer of scientific photography, and of colour photography which used thick layers of photo emulsion over glass plates. One of his contributions was the introduction of freezing technology into industry. He was a member and a co-founder of the International Association for Freezing Technology and the Committee for Industrial Freezing in Serbia (Paris, 1903; Vienna, 1910 respectively).

As a man of broad interests, he campaigned for the creation of Esperanto (Brussels, Belgium, 1908) – the world's best know auxiliary language, and pioneered the introduction of scientific terminology into the Serbian language, especially in the fields of astronomy and electrotechnics. First university textbooks on physics in the Serbian language were written by him as well as many books that popularized science. He initiated the publishing of the *Library for Theoretical and Applied Physics* in 1905, first of its kind in Serbia and helped the book *Nikola Tesla and His Inventions* see the light in Serbian translation. It came out in 1894, at the same time it was published in the USA.

Stanojević published 80 works: about twenty books, scientific abstracts, articles for general public and helped popularize technical science, physics, astronomy and electrical engineering.

Authos: *Šešić, Marija; Miljanić, Petar*

Aleksandar IVANOVIČ STEBUT (1877–1952)

Aleksandar Ivanovič Stebut, agronomist and pedagogue, was born on January 3, 1877, in Moscow, where he completed primary school and classical Grammar School. He graduated from the Faculty of Natural Sciences and Mathematics, University of Moscow.

Stebut first came in contact with science and the practice of agronomy, while still at primary school, through helping his father organize agricultural production at their *Krotkoe* farm known at that time as Dr. Ivan A. Stebut's experimental station.

For two semesters, during 1896–1897, Stebut specialized at Leipzig University, the Institute of Physics and Chemistry, and the Institute of

Plant Physiology. During 1907–1909 he specialized in genetics and plants improvement, first at Hochenheim College of Agriculture and then at Vienna College of Agriculture where, as a volunteer, he assisted Prof. Dr E. Tschermak.

In 1910 Stebut engaged in public service. He run Saratov Experimental Station and was the Head of the Institute for Plants Improvement. From 1915 to 1917, he was full professor at Saratov University and from 1917 to 1919, at Moscow University.

Stebut's last employment in Russia, before emigrating it in 1919, was at Simferopol University, at Crimea. In Russia, Stebut wrote and published many articles on agricultural issues, i.e. *General and Specialized Field Crop Production, Plants Improvement.* He produced some new breeds of wheat, and one breed of millet and sunflower. In 1919 Stebut was invited by Belgrade University to help establish the Faculty of Agriculture. He was soon appointed part-time professor of general field crop production and pedology, which he taught until 1924, when he was appointed full professor for the subjects of pedology, special field crop production, genetics and plants improvement. He was director of the Institute for Plants Improvement on the Faculty's experimental field in Zemun, until World War II broke out in 1941. He retired in 1942, but in 1948 he returned to work and also resumed teaching pedology. He was appointed director of the Pedology Institute and held the post until the end of his life. Stebut died on March 24, 1952.

With his pedagogical and scientific work, Stebut helped agronomy in his new country develop considerably and also laid the foundations for the development of pedology in Serbia, giving it prominence it deserved. Two of his textbooks, dealing with problems of agronomical sciences, deserve to be mentioned: *Basics of Genetics* and *Methodology of Breed on the Basis of Variable Statistics.*

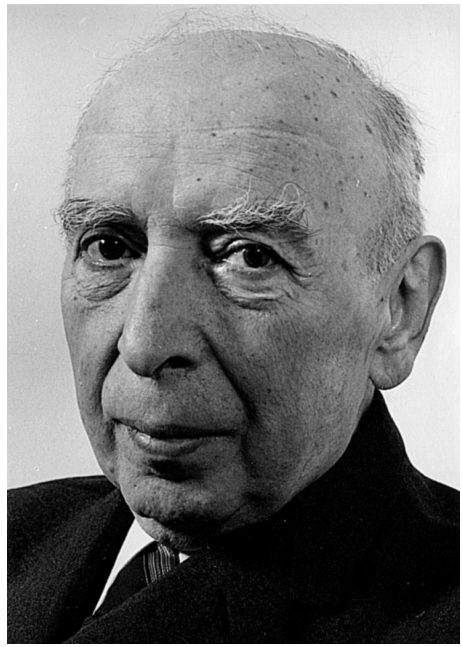
Educated in the spirit of Russian pedological school, he introduced the principles of observation and study of soil into the science of pedology in Serbia. He published two textbooks for students of agricultural in Belgrade: *Science on Soils* (Pedology, 1927) and *Agropedology*, the latter having three reprints. It was first published in 1949, the second reprint came out in 1950 and the third, posthumously, in 1953. He also wrote a textbook in German, for students from German speaking countries, entitled *Lehrbuch der allgemeinen Bodenkunde (der Boden als dynamischen System)* and published in Berlin, in 1930. This textbook brought him respect among European and world pedologists. Stebut, fluent in German and French, attended many international congresses where his presentations aroused interest and stirred discussions.

He is rightly regarded as a pioneer and teacher of pedological cartography of Yugoslavia. In 1926 he published the first *Pedological map of Yugoslavia, on a scale 1:3.500.000*, in colour. The same map was published in 1927 in Berlin, under the title: *Bodenkarte Jugoslawiens*. In 1931, his very precise *Pedological Map of the Kingdom of Yugoslavia, on the scale 1:1.200.000*, and with his comments, was published in the *Map Collection of the Geographical Society, N° 1*.

He wrote and published 18 pedological scientific works; 13 of them in the Serbian language, 3 in German, 1 in French and l in Russian. He discovered two new types of soil. Their original names *Gajnjača* and *Smonica*, as used by Serbian farmers, have been included in pedological literature. Using the so-called *lake plastique* of our prominent scientist Jovan Cvijić, he formulated a hypothesis about its hydrogenous and relict origin, according to which smonica is created during swamps drainage process. According to T. L. Bistricka and A. N. Tjurjukanov (1971), the study of smonica was the leitmotiv of his entire scientific work which he completed in 1947. He attained world renown through his research of smonica. As a special type of soil – paleo-hydromorphous and neo-hydromorphous, smonica was introduced into the World Pedological Map in 1968, edited by the famous Russian pedologist V. A. Kovde. His hypothesis on the hydrogenous and relict origin of smonica was contested in 1959 and 1963, but thanks to rather accurate analyses of his student, assistant and doctor of science Prof. M. Bogdanović, it was validated in 1953, 1955, 1958 and 1962. It was verified and acknowledged also by T. L. Bistricka and A. N. Tjurjukanov in their monograph *Černie slitie počvi Evraziji*, Moscow, 1971.

In his last scientific pieces of work (1946 and 1947), he pointed out to the similarity between the genesis of smonica and genesis of dark clay soils of subtropical regions, and according to R. Dudal (*Dark Clay Soils*, 1956) there are over 270 million hectares of such soil in the world. Thus smonica, as a type of soil, has been recognized as important as Russia's *černozem* (black soil), podzol and other soil varieties.

Author: *Bogdanović, Milovan*



Djordje STEFANOVIĆ
(1904–1988)

Djordje Stefanović was born on March 10, 1904, in Zemun. He finished elementary school in 1914 and Grammar School in 1922. He began his studies of chemistry at Technical College in Berlin in 1923, but after three semesters, in autumn 1924, he went to Zurich and continued his studies at the Philosophical Faculty. He completed his studies by defending his doctoral thesis under Professors P. Karrer and C. Naegeli, in May 1928.

At the beginning of 1930, Stefanović accepted a position at the chemical-pharmaceutical factory F. H. Hoffmann La Roch and Co. A. G. Basel, in Basel, where he spent five years in scientific research laborato-

ries dealing with different chemotherapeutical problems. In 1932 he was sent to Belgrade to established and put in operation a chemical-pharmaceutical factory which the company intended to construct. Due to the country's economic and political crisis the plan was not realized and at the beginning of 1936, Đ. Stefanović resigned from this work and dedicated all his energy to science.

From 1936 to 1939 he worked as a scientific researcher at the Chemical Institute of the Faculty of Philosophy in Belgrade. In 1939 he was elected assistant professor at the Medical School, Chemical Department, and taught organic chemistry to students of medicine and pharmacology. He also organized lectures for students of the newly established Pharmaceutical Department.

On April 3, 1941, Stefanović was drafted into the army. After the country's capitulation, he was taken prisoner and deported from Sarajevo to Germany. He returned to his country at the beginning of 1942, and in 1943 was appointed assistant professor at the Pharmaceutical Faculty. After the liberation, he resumed his earlier employment. He was elected associate professor of biochemistry in 1946, and full professor in 1954 at the Chemical Department of the Faculty of Natural Sciences and Mathematics. He taught biochemistry and chemistry of natural products until his retirement in 1973, was an assistant at the Chemical Institute of the Serbian Academy of Sciences since its establishment, and after its reorganization its scientific adviser until 1959.

For many years Stefanović held office as Director of the Chemical Institute of the Faculty of Natural Sciences and Mathematics, and the Head of the Chemical, and the Chemical and Physicochemical Departments at the same Faculty. He was a member of Serbian, Swiss and Dutch chemical associations, and was elected corresponding member of the Serbian Academy of Sciences and Arts on December 17, 1959 and full member on December 20, 1961. Under his mentoring over 200 graduation thesis, a number of M. A. papers, and over 30 doctoral dissertations were completed.

Stefanović published over 100 studies in Yugoslav and foreign journals, and won awards for four patents.

Authors: *Stefanović, Milutin; Bojović, Snežana*

Petar M. STEVANOVIĆ
(1914–1999)

Academician Petar M. Stevanović was born in the village of Baćevac, in the vicinity of Barajevo near Belgrade, on June 3, 1914 into a farmer's family. He went to primary school in his native Baćevac between 1925 and 1929, and continued his secondary education in Belgrade where he graduated from College in 1933. At school, he showed interest in natural sciences as well as a flair for foreign languages.

He enrolled at Belgrade University, the Faculty of Philosophy, where he studied at the Geology and Mineralogy Department and graduated in 1937. He enjoyed unselfish support by the then Professors Vladimir Laskarev and Jovan Tomić from the very first moment he came in contact with geology.

After completing his military service, and on recommendation of the malacologist Petar Pavlović, he began his work at the then Serbian Country Museum (now known as the Science Museum) in 1938. Almost from the very start, he was in charge of geology-palaeontology and mineralogy-petrography departments. He understood very early that being a geologist was closely connected with field research, which he was devoted to until the end of his days. He immediately set out to produce a detailed geological map of Belgrade and its surrounding area (the Department for Drawing of Geological Maps of Belgrade District at the Institute of Geology of Belgrade University). During 1939 and 1940 he worked at the Country Museum of Bosnia and Herzegovina in Sarajevo, and the Science Museums in Zagreb and Ljubljana, thus expanding his experience. At the same time his first scientific papers appeared in the *Geological Annals of the Balkan Peninsula*, and the *Chronicles of the Serbian Geological Society*.

During World War II, he was interned in Germany as a prisoner of war. Because of his patriotism and the refusal to cooperate with the enemy authorities, he spent the last two years at the "D" Barkenbirge detention camp for officers.

Petar Stevanović worked as a scientist and researcher at Belgrade University where, in 1946, he became assistant professor, and in 1957 full professor. He taught history of geology, palaeontology, stratigraphy of Yugoslavia, geology of Quaternary, and biostratigraphic methods. He conducted palaeontological research and spent two years in Moscow (1946-1948), on a Yugoslav government's scholarship, where he defended his doctoral thesis entitled *The Lower Pliocene of Serbia and the Surrounding Areas*. He was mentor to great many postgraduate students who worked on their doctoral thesis, producing finest pieces of mostly monographic nature.

As a scientist he devoted most of his time to studying stratigraphic and bio-stratigraphic characteristics of neogene terrains in our country, primarily the early Miocene and lower Pliocene. Knowledgeable in three world languages, he continually followed the latest developments in geology. He successfully explored neogene findings in the neighbouring countries, which he compared to those in his own.

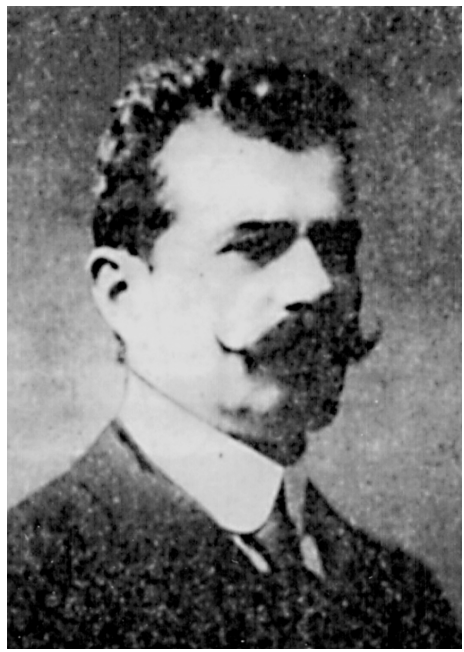
Results of Petar M. Stevanović's scientific research were published in over 200 papers, submitting the findings of his exploration and determining the age of many stratums more precisely. The ones that stand out are the profiles of coal bearing terrains of the Kolubara, Kreka and Kostolac basins. He revised the old and introduced a new nomenclature of the Pannon and the Pontian Substages, including classification of the

Neogene Paratethys. For many years he was on the editorial board, and for a while Editor-in-Chief, of the periodicals *Geological Annals of the Balkan Peninsula*, *The Voice of SASA* (the Serbian Academy of Sciences and Art), *The Science Museum Gazette*, and *The Chronicles of Serbian Geological Society*.

Thanks to his teaching and scientific achievements, Prof. Petar M. Stevanović became corresponding member of the Serbian Academy of Sciences and Art in 1952, and full member in 1965. Beside his engagements at the J. Cvijić Geological Institute of the Academy, he held office as Secretary at the Science and Mathematics Department for 13 years and helped found several academic committees, among them the Paleoflora Committee, the Paleofauna Committee, the Karst and Speleological Committee, and the Geodynamics Committee.

As well as attending all domestic congresses of geology, Stevanović participated in the working of numerous domestic and foreign scientific gatherings to his end. He was the recipient of many awards and honours.

Authors: *Eremija, Marko; Pavlović, Milorad*



Svetolik P. STEVANOVIĆ (1869–1953)

Svetolik Stevanović was born on March 5, 1869 in the village of Majdan at the foot of Mount Rudnik. He finished primary school in his village and continued his secondary education in towns of Gornji Milanovac, Čačak and Kragujevac where he passed his final exams. The same year he enrolled at the Faculty of Philosophy, Natural Sciences Department, of Belgrade College in and graduated in 1893.

After obtaining his diploma, he first worked as a teacher-trainee at the College, until 1894 after which he accepted the job of a junior clerk at the Ministry of Civil Engineering. Soon he became a lecturer at the Third Belgrade Grammar School for Boys. In 1896 he passed his teacher's com-

petence exam in subjects of mineralogy, geology and chemistry, and in 1897 he was appointed professor at the same school. He remained in the post until 1899 when he took a year long sabbatical to go to Munich, to expand his knowledge of mineralogy and crystallography under the famous Prof. Paul Groth. He spent two and a half years with him, beginning with the winter 1899 term and finishing with the summer term of 1902. On February 14, 1902 he earned his Ph. D. title by defending the thesis *Uber einige Kupfererze und Beitrdge zur Kenntniss der Zirkongruppe* and receiving the highest mark for it - *magna cum laude*. The following year, the famous German periodical *Zeitschrift fur Krystallographie und Mineralogie* published the most important extracts from his thesis. While in Munich, he familiarized himself with different teaching methods at secondary school level and used the valuable experience upon his return to Serbia.

Back in Serbia, Stevanović taught German at a school in the town of Jagodina and later at the First Belgrade Grammar School for Boys. In 1909 he became Principle of the Belgrade Grammar School for Girls and two years later Principle of the First Belgrade Grammar School for Boys. That was the time when he also experimented with minerals and crystals at the Institute for Mineralogy and Petrography under Prof. Sava Urošević.

He fought in the Balkan Wars as a reserve officer. In World War I, as captain 1st class, he was in charge of a troop near Šabac and Parašnica. He retreated with the Serbian army to Corfu, and in 1916 went to France. There, in Josier, he organized examination courses for our pupils and conscripts. After some time he was appointed Principle of the Serbian High School in Beaulieux, near Nice, where he remained until 1919, the year he returned to Serbia.

After World War I, Stevanović stopped teaching on a regular basis to became, in 1922, Head-of-Staff and than Assistant Minister of Education, the post he kept until he retired in 1924. Little is known about his life in the years that followed. In 1939 he had his monograph on Vrnjačka Banja published, having personally financed the project, and in 1941 also a monograph on Niška Banja. After World War II, his very important paper on *peridotite* from Zlatibor and its influence on the surrounding rocks appeared in a famous French periodical. He died in Belgrade, on May 10, 1953.

Svetolik Stevanović was the first scientist which paid attention to crystallographic testing of minerals in Serbia. The results of his analysis of *auripigments* from Alšar (Macedonia) were published in the well-known German periodical *Zeitschrift fur Krystallographie und*

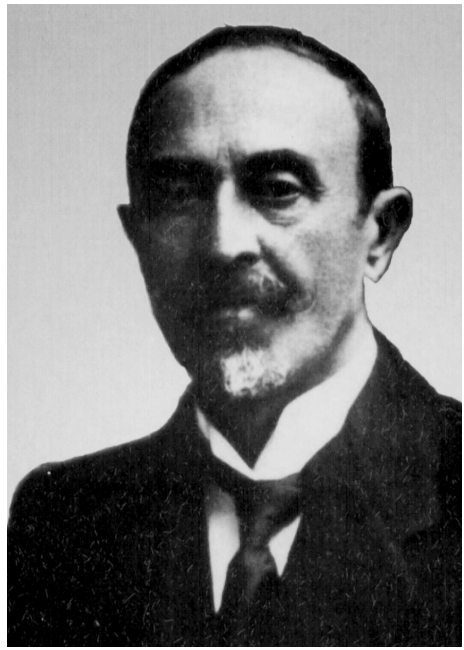
Mineralogie in 1904. Before his results were disclosed, the symmetrical class of *auripigments* had not been definitely established, and Stevanović made an important discovery by proving that their *apparent rhombic symmetry* was the result of twinning. He also proved that *auripigments* crystallize in monoclinic holoedry and that, with its crystal symmetry thus defined, it could be classified as mineral.

In his *Supplements to Serbia's Mineralogy* (1922), Stevanović mentioned that he his systematic research of Serbia's minerals had began even before the Balkan Wars and World War I broke out, which not only interrupted his work but also destroyed his collections and a considerable amount of paperwork so he was publishing only *what the enemy had spared*. He gave a particularly detailed description of *tamowitzite* from the Poštenje region, a mineral very little known of at the time. He also described *cerusite* from the localities of Poštenje, Maricev potok at Jagodnja and Ljuta strana on Mount Avala. *Jamesonite* from Prečica (Avala) was defined through crystallographic testing which proved it not to be *boulangerite*. He also studied copper ores from eastern Serbia: Borski potok, Suva reka and Kameni potok in Metovnica. Chemical analyses proved that the ore from Borski potok was a mixture of *bornite* and *chalcosine*, while the Suva reka and Kameni potok ores were a mixture of *pyrite* and *chalcosine*. One sample of Bor *chalcosine* displayed small crystals which Stevanović, based on crystallographic measuring, classified as *enargite*, the mineral known only in the Tyrol region and Hungary at the time. Stevanović also discovered 7 new trapezoidal shapes of *cinnabar* from Avala.

Svetolik Stevanović was a member of the Geological Society of Serbia. Between 1903 and 1905 he was Secretary and the Editor of the *Notes of Geological Society of Serbia.* Also, he was a member of the French Mineralogical Society in Paris and was very busy at the Teachers' Society as its secretary, deputy president and president. As president, he deserves credit for uniting all teachers' societies from the territory of the Kingdom of the Serbs, Croats and Slovenes, which also earned him the title of the Honorary President of the Teachers Societies Union.

Svetolik Stevanović left considerable traces on Serbian geology, crystallography in particular. Had he been offered a position at Belgrade University, the sciences of crystallography and mineralogy surely would have developed even more and faster, and the works of Stevanović would have been more extensive.

Author: *Jović, Vidojko*



Kosta STOJANOVIĆ
(1867–1921)

Of all of Serbia's distinguished scientists, Kosta Stojanović is the one that is least known of today. His work – developed in the fields of mechanics, mathematics, physics, sociology and economics – has been disregarded and his ideas remained non-comprehensible, although the time and subsequent scientific development have corroborated them. He was born in Aleksinac, on October 2, 1867, the same crucial year in which the keys of the Belgrade Fortress were ceremoniously handed over to Prince Mihailo.

He studied mathematics at the Faculty of Philosophy, Belgrade College, and graduated in June 1889 as the best student in his class. He went to Paris in 1893, to continue his studies of mathematics, astronomy,

mechanics and physics. In 1897 Stojanović went to Leipzig and there he obtained his Ph. D degree in mathematics. After the 1903 Coup d'État, he was appointed honorary lecturer at Belgrade College, and following its conversion into Belgrade University, associate professor of applied mathematics at the Faculty of Philosophy.

In the period between April 1906 and June 1908, during the economic conflict that existed between the Kingdom of Serbia and Austro-Hungary, he proved his statesmanship talents. The intellectual and scientific powers of his political strategy, based on cybernetic understanding of social processes and their control, proved successful and also surprised Austro-Hungarian conservative strategists.

He died suddenly, on January 3, 1921, several days after being nominated as the Minister of Finance in the first Yugoslav government, with Nikola Pašić as Prime Minister.

He strived to find an efficient methodology that would unite alienated approaches within natural and social sciences. Milutin Milanković pointed that *…the work of Stojanović, based on exact science, enters the field of descriptive sciences and thus bridges the gap between the two*. The life's work of Kosta Stojanović is characterized primarily by his endeavours to comprehend the totality and to combine mathematical, natural and social sciences.

Such a tendency was feasible only in mechanics, which to him was an expression of the principle of continuity. Stojanović, in fact, observed the continuum emanating in different phenomena and processes which were subjected to the laws of basic mechanical structure. His philosophical approach, recognizing the transcendental character of basic scientific concepts, diverged from the 18th century mechanicism, as well as from the subsequent positivism. Stojanović fully understood that the basic mechanicistic principles, although constant and invariable, reflected the structure of our logic. As a consequence, he searched for the link between mechanicistic interpretations and general theory of cognition. The link was primarily found in the concept of analogy. Stojanović explained the methodical justification of analogy by postulating that every process can be observed as a mere product of energy transformations. All energies and observed phenomena cannot be substantially separated from one another but are merged into a single motion, interpreted separately - depending on our viewpoints - and measured by units of the known categories of time, space and mass. He pointed out that connections between causes and effects attain different names depending on the place where the processes occur. Consequently, only analogies existing in various forms of motion can be recognized.

Stojanović very much wanted to prove the reciprocity of mathematics and physics, and their interpretations of the same phenomena, but also wanted to demonstrate that the number of their theorems could be halved if reduced to mechanics. Interpretation of physical phenomena approaches closest to its real task when reduced into seeking of the mechanical causes of the phenomena, whereas, in this sense, the most general problem of physics has to be identified with the most general problem of mechanics.

Mechanics not only supports mathematics and physics but also enables true and exact interpretations of social processes rather than descriptive ones. Interpretation of social phenomena relies on the comprehension of thermodynamic processes, with entropy as the fundamental category. In relation to this concept, Stojanović verified meaning and significance of any process whatsoever, i.e. the status of any system, whether biological, social, economical, physical or psychological. Thus he defined entropy as a concept with a cognitive potential, valid on different levels of comprehension. Hence the notion that Stojanović's social theory preceded cybernetics is completely accurate. Using mathematical methods Stojanović defined a concept whereby *animal motors* only *illusively differ from thermal ones*, just as Norbert Wiener did, several decades later, while investigating analogies between living organisms and machines. It should be remembered that although his most significant work *Interpretation of Physical and Social Phenomena* was published in 1910, his numerous manuscripts prove that the results of his analyses presented in the book were known as early as 1888.

The treatise *Foundations of the Theory of Economic Values,* his most outstanding piece on economy, was written between 1906 and 1908, and published in 1910. It offered an original theoretical attempt of the author to find a link between thermodynamic and economic processes, i.e. between physics and economy, as well as a mathematical explanation of the analogy between thermal and economic processes. Establishing such a systematic comparison, Stojanović took the lead in the field of economic theory. He suggested that through appropriate interpretation of thermodynamic analogies, thermodynamics could be transformed into a mathematical theory of economic phenomena.

Stojanović drew a mathematical analogy between thermodynamics and economy, suggesting similarity between six cardinal elements: mechanical work being proportionate to economic labour, temperature to demand, pressure to supply, volume to value, heat quantity to capital, and energy to wealth.

Author: *Petrović, Aleksandar*

Miloje M. STOJILJKOVIĆ (1873–1962)

Miloje Stojiljković, the founder of the Department Physical Chemistry, and the first director of the Institute of Physical Chemistry at the Faculty of Philosophy in Belgrade, was born in 1873, into a prosperous merchant's family. He finished elementary and secondary schools in Belgrade and studied at the Natural Sciences and Mathematics Department at Belgrade College. After graduation in 1896 he continued his studies of natural sciences at Leipzig and Geneva Universities. He personally covered the expenses while attending lectured given by the most eminent physical chemists of the time, Wilhelm Ostwald, Van't Hoff, Nernst and Guye. His doctoral dissertation entitled *Recherches sur*

l'activite optique de l'alcool amylique et du benzoa-te d'amyle was defended in 1902, in Geneva, under Prof. P. A. Guye, one of the founders of physical chemistry.

In 1903 he was appointed senior lecturer for physical chemistry at Belgrade College. Five years later he founded the Institute of Physical Chemistry at the Faculty of Philosophy in Belgrade.

Stojiljković fought in the Balkan Wars of 1912–1919, first as a sergeant of the Serbian Army, then as a company commander. By the end of the war he was promoted to reserve lieutenant colonel, and received the highest military honours. In 1919, after the war ended, he was appointed associate professor, and in 1929 full professor at University. He retired in 1942, but after the war he was back into action, this time as director of the Institute of Physical Chemistry. He finally retired in 1948.

He died in Belgrade, in 1962.

Stojiljković's greatest contribution was the setting up and running of the Institute of Physical Chemistry and the introduction of a modern and experimental teaching curriculum. A great shortage of funding and lack of adequate equipment in the laboratories were not conducive to serious research work. Amongst many things, Stojiljković was engaged in evaluating calorific properties of domestic coals, measuring optical rotational dispersion, performing saccharimetry, conducting electro-analyses, etc. He presented his work results mostly at meetings of the Serbian Chemical Society, of which he was vice president until World War I.

After retiring, Stojiljković wrote a rather big book on colloids and their utilization, and numerous articles on popular scientific topics.

Authors: *Ribnikar, Slobodan; Bojović, Snežana*

Lazar J. STOJKOVIĆ
(1904–1977)

Prof. Dr.honoris causa Lazar Stojković was born in Novi Sad, on March 23, 1904. He attended elementary school, and Serbian Grammar School from which he graduated in 1922, in his native city. He studied at the Vienna School of Agriculture. After graduating from it in 1928, he specialized for one year at the same Faculty, at the Plants Production Department. He also spent three months at the Biological Institute in Prague during 1938, studying problems of agriculture and paying particular attention to plant breeding. During 1953, he spent two months at Agricultural College in Urbana, Illinois, USA, where he studied hybrid seeds production. He also made study-visits to Bulgaria, the Federal Republic of Germany, the USSR, Austria and Hungary between 1935 and 1967.

After his military service, he accepted a position of an assistant at the Plants Production Department of Agricultural Faculty in Zemun (1931-1934). He also worked, until 1938, as an agrotechnician at the Agricultural Experiments and Control Station at Topčider. In 1938 he moved to Novi Sad, to the newly established agricultural station. He worked as the Head of the Plants Production Department until the beginning of World War II.

After the liberation, Stojković was appointed the first Director of the Agricultural Experiments and Control Station in Novi Sad. Between 1945 and 1954, the Station flourished under his administration and was upgraded to the level of a research institution now known as the Institute for Field Crops and Vegetables Production in Novi Sad. Stojković also campaigned for the establishment of the Agricultural Faculty in Novi Sad, believing that the center of Yugoslav agriculture should have its own high-powered institution at a university level which would be oriented towards educating professionals and implementing modern agrotechnical measures; mechanization and irrigation into agricultural production.

The Agricultural Faculty in Novi Sad opened in 1954 and Stojković was elected its first Dean. He held office until 1958. In 1960 Stojković helped with setting up of Novi Sad University and Rectorate and was in office as the first Rector between 1960 and 1963. As a full Univeristy professor, he taught the subjects of general field crops and agroecology to graduate and post-graduate students, until his retirement in 1976, and occasionally after that, until he died on March 3, 1977.

Stojković published 50 scientific papers, 40 abstracts, 15 monographs, numerous studies and reports on plant production. He created nine recognized cultivars of winter and spring wheat, winter rye, corn, winter barley, oats and vetch. He also published textbooks *General Field Crops Science* (I and II volume), 1962 and *Basics of Plant Production in Irrigation,* 1964. He was mentor to eight candidates working on their doctoral dissertations.

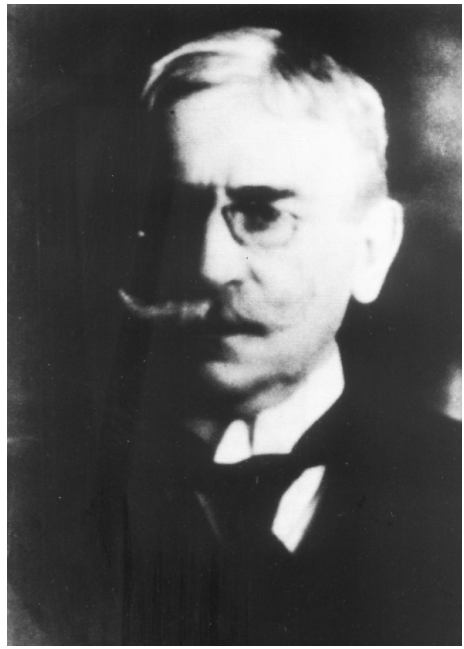
Stojković's expertise, as well as his organizational skills, greatly helped agricultural production in Yugoslavia after the war, especially in the regions of field and vegetable crops cultivation. Findings of his research work were particularly useful and widely applicable in production and long-term planning of production and he always emphasized the importance of interdependence between a plant and a place of its cultivation. Stojković never allowed fleeting scientific trends cloud his judgment and was adamant about preserving *traditional methods of experiments.* Time has proven him and his ideas right.

Stojković was a member of many professional and scientific societies such as the Matica Srpska Society and its Science Department, the International Institute for Research of Sugar Beet (Tierlemont, Belgium), and the Council for Scientific Research of the Peoples' Republic of Serbia. He also held office as president of the Society of Engineers and Technicians of the Autonomous Province of Vojvodina, president of the Council of Experts of the Museum of Agriculture in Novi Sad; was a member of the Plenum of the Socialist Alliance of Vojvodina, a deputy of the Council for Culture and Education of Vojvodina, president of the Association of University Professors and Scientific Workers in Novi Sad, a Vice-President of Matica Srpska in Novi Sad and a member of the Chamber of Vojvodina.

Stojković was on editorial boards of many domestic journals, among which were *Natural Sciences Collection of Matica Srpska* (was later its editor-in chief), *Archives of Agricultural Science,* and *Contemporary Agriculture* and he edited articles, essays and reports published by the Agricultural Faculty in Novi Sad, and was a co-editor of the *Agricultural Encyclopaedia.* He was the recipient of the highest scientific and public awards and honours: *the Federal Government Award*, *the Liberation of Vojvodina Award*, *the Order of Labour of the 1st Class*, *the Order of Merits with the Silver Ribbon*, *the 7th July Award*, *the Republic Order of Merits with the Silver Wreath*. In 1974 he was elected first honorary doctor of science at the University of Novi Sad.

Stojković bequeathed his entire property, and his sister's Saveta's, to the Matica Srpska Society and the Institute for Field Crops and Vegetables Production in Novi Sad. Every third year the *Foundation of Lazar and Saveta Stojković* of Matica Srpska grants awards to young scientists for their outstanding achievements in the field of agroecology.

Author: *Molnar, Imre*



Vojislav J. SUBBOTIĆ (1859–1923)

Prof. Dr. Vojislav Subbotić, the father of Serbian surgery, was born in Novi Sad, in 1859, the son of the poet Jovan Subbotić and his wife Savka. After completing his elementary and secondary education, he studied medicine in Vienna and Paris. As a student of medicine he fought in the Serbo-Turkish War in 1876. In 1881 he obtained his Ph.D. in medicine, in Vienna, after which he studied pathological anatomy under Prof. Rokitanski. He was subsequently appointed assistant to the well known Viennese surgeon, Prof. E. Albert, one of the best in those days, where he completed advanced studies in surgery.

He began his practice as a physician in Zemun, in 1884, and achieved reputation during the 1885–1886 Serbo-Bulgarian war through

treating the wounded in Belgrade. Following the invitation of the Serbia's Public Health Department, he opened the first ward for surgical operations in Belgrade in 1889.

He was an outspoken advocate of conservative approach when it came to treating war wounds and his motto - *Do not touch the wound!* – and the use of Lister's antiseptics became generally accepted. A tireless worker and strict disciplinarian, Dr. Subbotić succeeded in introducing and maintaining modern standards of cleanliness and sterility. As director of the new hospital in Belgrade, he placed surgery on a new footing.

His advanced courses in surgery for physicians, conducted under the auspices of the Serbian Medical Association, were in fact the first school of surgery in Serbia. He organized the First Congress of Serbian Physicians and Naturalists in 1904, and the First Congress of Serbian Surgeons in 1907. Indeed, Dr. Subbotić may be considered the founder of modern Serbian surgery. He was also a proponent of the idea to set up an association of physicians in South Slav countries. His determination to improve surgical procedures earned him deep respect of his followers and colleagues who continued in his footstep after he died.

During World War I, he was an army surgeon and although seriously ill, he accompanied the Serbian Army on its arduous retreat through Albania. Subsequently he joined the Inter-allied Commission in Paris and London (1916-1918). Early in 1918, he returned to Thessaloniki and, on his personal request, was sent to the front and the hospital at Dragomirci, an elite hospital of the Serbian medical corps. Having acquired experience in the war, and as an exceptionally talented and well educated surgeon, Dr. Subbotić was accepted into many international associations, including the Paris Medical Academy. His writings on the use of the circular suture of blood vessels in war conditions received considerable international attention. His method, even forty years later, was still the preferred technique of war-time surgery. This fact shows how far ahead of his times Dr. Subbotić was in advocating the use of the circular suture in battlefield conditions. His classification of arteriovenous aneurysms was widely accepted and referred to in books on vascular surgery.

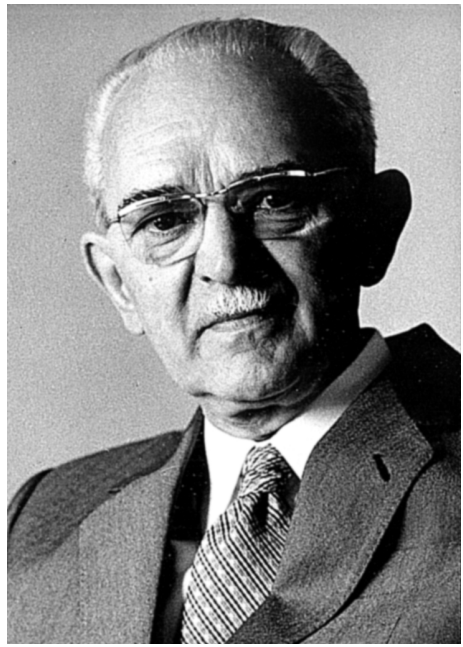
Even though he lived and worked in times of frequent wars, having personally fought in five of them, Dr. Subbotić found time to keep abreast of developments in his field. He wrote 36 research papers, 16 of which were published abroad, thus promoting the image of Serbian surgery in the world. For five consecutive years he was elected president of the Serbian Medical Association, and in 1919 he became a full professor of surgery at the Medical School in Belgrade. Together with Prof. Milan Jovanović-Batut he campaigned for the founding of a school of medicine

in Belgrade, which opened in 1920. In 1921, Dr. Subbotić was elected Dean of Medical School. That same year he founded the First Surgical Clinic in Belgrade and was appointed its first director.

The last months of Dr. Subbotić's life were marred by severe pains and illness. His wish was to die at work, but in the end he succumbed to the illness and died on December 4, 1923, in Belgrade, missing the opportunity to give an inaugural address at Medical School, the establishment of which he had so ardently advocated.

He has left an indelible mark on Serbian surgery in the times in which he lived and worked.

Author: *Gerzić, Zoran*



Aleksandar TERZIN (1911–1987)

Terzin was the father of Yugoslav virology and the founder of three virology laboratories (Belgrade, Sarajevo and Novi Sad) as well as a member of the WHO Board of Experts and director of the Yugoslav Regional Influenza Center (1951).

He was born in Sent Andrea (Hungary), on September 16, 1911 and he studied medicine in Budapest, Belgrade and Zagreb where he graduated in 1939. During 1939/1940 he worked as an assistant microbiologist at Belgrade Medical School. He spent the war years fighting typhus in Serbia. In 1945 he became Deputy Head of the Bacteriological Department of the Federal Institute of Epidemiology. He attended Harvard Medical School between 1946 and 1949, where he mastered

virology diagnostics, after which he returned to Yugoslavia to set up the first virology department. He soon started routine as well as research work with his assistants. In 1951 federal institutes were closed and Terzin was appointed Head of the Virology and Immunology Department of the United Institutes of Serbia. He went abroad to secure equipment and research grants from England, Switzerland and the US.

In 1953 Terzin became assistant professor and in 1959 full professor of virology at Sarajevo Medical School where he founded the Institute of Virology and Immunology and continued diagnostic, pedagogical and research activities with a new team. In 1964, Novi Sad Medical School offered him full professorship. For the third time he found himself at the Institute of Virology and Immunology, this time within the Institute for Health Protection where subjects pertaining to epidemic prevention were taught. He established one more research team. Although he retired in 1975, he continued his research work for several years. He went to Sarajevo and Novi Sad and each time the Yugoslav Regional Influenza Center moved with him. Based on Terzin's methods, the Yugoslav school of virology produced outstanding assistants and teachers – Terzin's worthy successors. He also co-authored a textbook about microbiology which had three reprints.

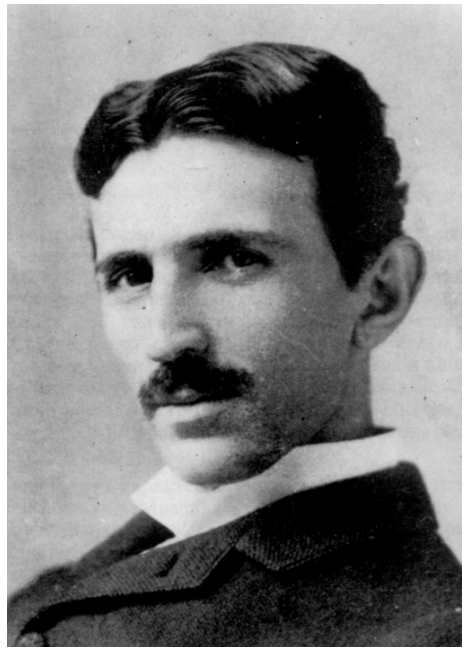
The list of all of Terzin's professional and social activities is quite impressive. Hundreds of his essays appeared in the *Experta Medica* and *Biological Abstract* periodicals, and he also submitted reviews and reports to the World Health Organization, and to different science academies and universities in the country and abroad. Terzin was a member of many professional associations, and a chairperson of many committees, councils and professional boards at the Institute, the University and the Medical School. He attended many professional seminars and conferences. He was on the editorial board of the *Acta Virusologica* periodical for many years, as well as several domestic and foreign magazines. His articles were published, and he attended conferences in Austria, Czechoslovakia, England, Hungary, the USA and the USSR. He was an esteemed member and an associate of the Matica Srpska Society. He was a corresponding member of the Serbian Academy of Sciences and Arts since 1959 and its full member since 1974, also a corresponding member of the Vojvodina Academy of Sciences and Arts since 1981, the Medical Academy of the Serbian Medical Society since 1978 and the New York Academy since 1980. He was busy as a lecturer and was invited by 6 universities in the USA and the USSR. He also received *the Medal for Labour of the 3rd and 2nd Class* for his services to the country, and *the Order of Labour with the Red Flag*, and *the 27th July Award of Bosnia and Herzegovina*.

Terzin will best be remembered for his research work. We are much indebted to him for all of our present virology and immunology laboratory techniques and diagnostic methods. He conducted a lot of research on influenza, adenoviruses, chlamydia, microplasma, Leptospira, Toxoplasma gondii. He and his assistants studied and established a full picture of local epidemic influenza virus types A and B, psittacosis-ornithosis, typhus, pneumonia virus, endemic nephritis in Bosnia and Posavina, the *Celj* disease, viral disease of sheep in Herzegovina and the pandemic of Asian flu. He produced remarkable ecological causation analyses of typhus, tick encephalitis, rickettsiae, sandfly fever. He established the connection between the typhus Q fever and the ethics of social behaviour. He devised a personal model for measuring locomotor muscle activity, studied the link between viral infections and chemical toxicity, and discovered *gender* related discrepancies in conditions of fasting. With his research team he also discovered significant differences in bioelectrical activity between healthy and infected chicken embryos of equal maturity.

Terzin conducted numerous immunological experiments, some of which produced valuable practical results. He supervised his research team at the Military Medical Academy (MMA) which studied live oral vaccine against bacillary dysentery, until it was perfected and accepted around the world. Many of his antigen preparations are used nowadays in the diagnosis of Leptospira, psittacosis-ornithosis and trachoma. He determined the role of dust in spreading of psittacosis and other Bedsonia viruses. Together with his MMA assistants he modified the known technique for measuring fagocytic activity in citratetreated blood. In serological studies of Bedsonia viruses he often used the reaction of complement inhibition and described certain regularity in the appearance of RVK inhibitory antibodies depending on the type of infected animals, stage of infections and the method by which antigen were applied. He described the unilateral technique for determining whether the appearance of the prozone in RVK is the result of the presence of non-specific inhibitors, on *non-complementary* antibodies, or of excess of regular antibodies.

The last years of this remarkable man were marred by a decline of his faculties which he never came to terms with. He died in Novi Sad, on December 12, 1987.

Author: *Radovanović, Miroslav*



Nikola TESLA
(1856–1943)

Nikola Tesla was born on July 10, 1856, in the village of Smiljan in Lika, which at the time was part of the so-called Military Frontier of the Austrian Empire. After completing secondary school in Gospić and Karlovac, in 1873 he enrolled at the Graz Polytechnic, in Austria. In Graz, Tesla began working on a new electrical motor that would be simpler than the existing Gramme machine. Tesla studied for a year in Prague, after which he went to Budapest, where he began his career as an engineer in the first telephone exchange there. In 1882 he discovered a new method of creating an electric field through alternating current and thus realized his dream from student days. The following year he went to Strasbourg to

build his first experimental alternating current induction motor. In 1884 he left Paris and his job at the Continental Edison Company and went to America. He worked for T. A. Edison for one year but gave up his job having realized that with Edison he would not be able to develop his own ideas which he already had in Europe. In 1887 he founded the Tesla Electric Company and filed for 40 patents to protect his polyphase system. In the following year, Westinghouse bought out these patents and, using them, started the production of electric motors and generators operating on alternating current. Thus began a new wave of industrialization, the second electrical engineering revolution, based on Tesla's inventions. With the construction of the hydro-electric power-system at Niagara Falls in 1896, Tesla reached the pinnacle of his career.

In the meantime he began new research, and in the period between 1890 and 1900, he experimented intensively with high frequency currents and their application in lighting, medicine, radio, and wireless transmission of power. At the end of 1899, he built a laboratory in Colorado Springs, where he constructed a radio transmitter using exceptionally high voltage, and where he made several important discoveries in radio engineering. In 1901 Tesla started building a tower with a laboratory on Long Island near New York City, intending to test telecommunication and power transmission systems, but was forced to discontinue the work because of fund shortage. Starting in 1908 he conducted extensive tests with a new type of bladeless turbine, hoping that he would raise enough money from the sale of his patents to continue experiments with his wireless power transmission. With some interruptions he worked in this field until about 1930, when he finally abandoned commercialization of his inventions. Nevertheless, he never stopped his research, and until the end of his life he worked on new inventions, some of which, such as telegeodynamics and death rays, continue to excite the imagination of Tesla's admirers. He died on January 7, 1943, in a New Yorker Hotel, at the age of 87. During his lifetime he received a number of awards and honorary doctorates from America's and Europe's most prestigious universities. He received posthumous honour, having the scientific unit of electromagnetic induction named after him.

Tesla's principal contribution in the field of electrical engineering was the discovery of polyphase alternating currents which create a rotating magnetic field when connected to a system of stationary electromagnets. In practice, alternating fields enabled electric power to be generated, utilized and transmitted over long distances, a system which has not essentially changed to this day.

Another one of Tesla's outstanding inventions was a high-frequency transformer in the generator of high-frequency currents based on the

previously unknown effects of transformation within the system of primary and secondary coils. The Tesla coil is widely used in radio transmission, dielectric and induction heating, medicine, generation of X-rays, remote radio control of moving objects, light production in tubes with low-pressure gas and tubes filled with fluorescent materials.

In the field of mechanical engineering, Tesla concentrated mostly on fluid mechanics and turbines. He systematically investigated the flow of liquid between two discs rotating at the same speed, as well as between a rotating and a stationary disc. Between 1908 and 1913 he worked on establishing fundamental laws that regulate the flows in these cases and used the knowledge to design his original bladeless turbines.

Authors: *Marinčić, Aleksandar; Jovanović, Branimir*

Živojin TEŠIĆ
(1908–1994)

Živojin Tešić was born on March 30, 1908, in Brdani, near Gornji Milanovac, where he completed his elementary school with excellent grades. Teachers' remark in his certificate read – *Worthy of attention*. He finished High School in 1928, as the best pupil of his generation, after which he enrolled at the Faculty of Agriculture and Forestry, Agricultural Department, and finished it in four years with best marks. His final exam paper *Biological specialization of Puccinia sp.* was written under the mentoring of Prof. Mladen Josifović.

After studies, Tešić attended the Reserve Officers School in Sarajevo, in 1933, and continued his professional training at the Agricultural Experimental Station at Topčider during 1933–34. He was

appointed assistant lecturer for the subject of microbiology at the Faculty of Agriculture in 1934. Three years later, he passed his assistant's exam at Zagreb University with the paper *Principles and Application of New Methods of Vinogradsky in Soil Microbiology.* He obtained Ph.D. from the Faculty of Agriculture, University of Belgrade in 1938, defending the dissertation entitled *Bacteriosis of Our Beans.* During 1938-39 he was in France, Versailles and Paris, specializing at the National Center of Agricultural Research and the Plant Pathology Central Station.

Upon his return from France in 1933, Tešić was appointed assistant professor for the subject of agricultural microbiology at the Faculty of Agriculture in Belgrade and was Head of the Institute of Microbiology. He also taught microbiology. In 1941, he was drafted into the army and taken prisoner to the Nazi camp in Nuremberg.

His first textbook on agricultural microbiology was written in 1947, and the second - *Microbiology of Forest Soil* - two years later, in 1949. The latter won him the *7th July Award*. Those were the first textbooks on agricultural microbiology that included the soil microbiology syllabus.

Tešić was elected associate professor in 1948 and full professor in 1956. He spent a short period of time at the Pasteur Institute, the Department of Soil Microbiology in Paris. He also took study-visits to the USSR, the USA, Czechoslovakia and Bulgaria. He was elected corresponding member of the Serbian Academy of Sciences and Arts in 1961 and full member in 1971.

Besides teaching, he actively pursued research work addressing problems of phytopathogenic bacteria, general microbiology and soil microbiology. Those works were presented at international scientific meetings, and reports appeared in foreign scientific journals and were quoted in textbooks and manuals in our country and abroad. He participated in many congresses and seminars at home and abroad. At several such meetings he was member of organizational committees. At University, he held several positions; he was Director of the Institute of Microbiology, Vice-dean, Dean and a member of many boards and committees. He was president of a number of Yugoslav and foreign expert associations and societies, and Editor-in-Chief of the scientific journal *Microbiology* since its foundation in 1964.

Živojin Tešić belongs to a group of scientists who greatly contributed to the establishment of contemporary agricultural science in Yugoslavia. His greatest achievements were in the field of agricultural microbiology and the provision of trained professionals. His textbooks on microbiology, with their quality and contemporary methodology, rank among the best of their kind.

He used his knowledge and experience to launch the study of soil microbiology and phytopathogenic bacteria in our country. He indebted the world of science with his works on systematization of microorganisms in which his studious contemplation, commitment to theoretical work and rejection of dogmatism are particularly evident.

Prof. Tešić's research in the field of soil microbiology broadened the knowledge about a number of micro-organisms that live in the soil, and of the relation between certain taxonomic and physiological groups, and certain factors that affected their representation. Thanks to Tešić, the qualitative and quantitative compositions of microorganisms in the soil are well known nowadays. Besides the type of soil, their variability is determined by a number of ecological factors, and the man's application of agrotechnical and melioration measures. Tešić's research results augment findings of other microbiologists in our country and abroad.

He assisted young scientists doing research in soil microbiology where, along with physiological groups of microorganisms, soil-respiration, content of ammonia, nitrite, nitrate, carbon, activity of certain enzymes-dehydrogenase, proteinase, urease, oxidase, some new activities and processes within the micro flora were discovered. Apart from certain physiological groups of microorganisms, also determined were rhizospere of certain plant species and species of micro-organisms dominant in certain type of soil. Special attention was given to the activity of primary nitrogen in the atmosphere binding with nitrogen fixing bacteria and to the primary and secondary products of their metabolism, such as amino acid, vitamins, stimulative and inhibitory substances of the auxin, gibberellin and phenol types.

The entire pedagogical and scientific opus of this Serbian scientist reflects his unquenchable thirst for knowledge.

He died on April 23, 1994, in Belgrade and was buried there.

Author: *Sarić, Zora*

Dobroslav B. TODOROVIĆ (1889–1959)

Dr. Dobroslav Todorović was born on February 28, 1889, in Kraljevo. He attended Grammar School in Belgrade and Kragujevac. He graduated from the Faculty of Agriculture in Vienna, where he defended his doctoral dissertation under the title *Study of Some Maize Cultivars in Different Climate Conditions*. Between 1922 and 1959 he was professor at the Faculty of Agriculture, Belgrade University. He was a member of the Czechoslovakian Agricultural Society and a corresponding member of the Serbian Academy of Sciences and Arts.

Todorović contributed greatly to the development of agriculture, especially in the area of field crops and agrarian ecology. His scientific

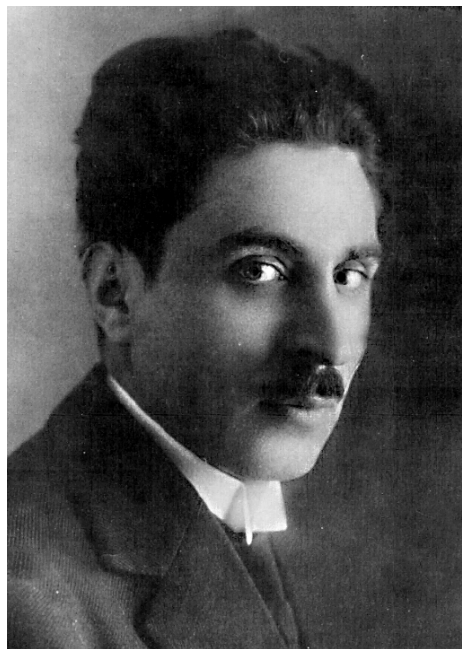
concept and theory on preparing the soil for growing of cultivated plants is of greatest importance. He paid special attention to the study of soil, considering it the precondition for successful plant production. Preparations of soil, rotation of plants, agrotechnical measures, as well as problems of weed-control were issues which he addressed with particular attention. He also endeavoured to find solutions to complex problems of agricultural zoning system.

Todorović founded agro-ecological science in Yugoslavia. His famous textbook *Growing Field Crops Based on Agro-Ecological Principles* (1955) offered, for the first time in Yugoslavia, an ecological foundation for field crops production, namely the agro-ecology based concept of agriculture.

Dobroslav Todorović deserves a special credit for the elaboration and systematization of scientific terminology. His broad knowledge and experience, his mastery of the Serbian language and fluency in German, English, French and Russian, helped him in his scientific endeavors. He published 55 scientific papers in a number of well known Yugoslav and world scientific journals and wrote 10 monographs. The pedagogical work of Dr. Todorović represented the pinnacle of the teaching practice at Belgrade University and he received many Yugoslav and foreign prestigious awards and public honours for his achievements.

He died in Belgrade in 1959.

Authors: *Kojić, Momčilo; Božić, Dikonije*



Jovan S. TOMIĆ
(1891–1946)

Jovan S. Tomić was born on January 13th, 1891 in Soko Banja, into a merchant's family. He attended primary school in his native town and graduated from high school in Niš, in 1910. Afterwards he enrolled at the Faculty of Philosophy, Geological Department, in Belgrade. After the break-up of Serbia in 1915, he went to France where he worked as a lecturer and a youth counsellor to our refugee children attending a school in Pons. He left the position in 1916 and went to Grenoble in order to continue his studies under the famous Prof. Kilian at University there. Tomić successfully passed exams in hydrogeology and applied geology. He also wrote a paper in the field of palaeontology which was published in 1921.

He remained in Grenoble until 1919 after which he went to Paris where he worked for a short time at the Mineralogy Laboratory of the Natural Science Museum, under the famous Prof. Alfred Lacroix. Tomić returned to Serbia in 1920 and soon graduated from the Faculty of Philosophy in Belgrade. His first post was as a teacher of mineralogy at the Third Grammar School in Belgrade. In 1922 he was elected assistant at the Institute of Mineralogy and Petrography. The next twelve months he spent in France working on his doctoral thesis. In Paris, at the Mineralogy Laboratory and under the famous Prof. Alfred Lacroix, Tomić mastered the new methods in petrography which also included chemical and mineralogical classification of volcanic rocks. During his stay in Paris, Tomić studied volcanic rocks from Kotlenik, Serbia and finished the biggest part of his doctoral thesis entitled *The Petrographic and Geological Studies of Kotlenik* which he defended at the Faculty of Philosophy in Belgrade in 1926. The following year he was elected assistant lecturer at the Department of Mineralogy and Petrography of the same faculty. In 1929 Tomić went to Paris again to study rock samples which he collected in the region of Kratovo and Zletovo. In 1930 he became an assistant professor, and in 1939 a full professor. After World War II, he was elected president of the Court of Honour of Belgrade University and appointed Dean of the Faculty of Philosophy. From 1945 until June 1946, he was president of the transitory administration of the Board of Initiative of the Serbian Geological Society. He was also the Head of the Mineralogy and Petrography Department of the Faculty of Philosophy. He died in Belgrade, on June 28th, 1946.

Jovan Tomić was completely dedicated to petrography but limited his research on the volcanic rocks of Serbia and Macedonia. He also, to a lesser degree, explored *granitoid* and *crystalline schists*. His most important work, published in 1926, was the study of Kotlenik from petrographic and geological point of view. The study offered certain novelties as regards petrographic analyses in Serbia. Based on overall exploration of volcanic rocks (mineral composition, structure, texture, geological forms of appearance) he, as a matter of fact, discovered a line of crystallisation differentiates of magma – from *dacite* to *andesite* to *basalt*. He was first to apply chemical analysis in the study of volcanic rocks in Serbia. On the mount Ozren near Soko Banja, in 1928, Tomić found *basanite* (a type of *alkaline basalt*), a rare and until then unknown rock in Serbia. That was the first discovery of *nefelinic* rock in Serbia.

In 1929 he published his study on the granite massif near Stip. Tomić was first to discover the existence of *monconite* granite in the Stip massif. Similar one was discovered on the mount Kosmaj but only after

World War II. In 1929, in the region between Bregalnica and Vardar, he discovered various volcanic rocks: with *leucite* (*kajanite*) and without *leucite* (*trachyte* and *shoshonitic basalt*). Because of the well defined appearance of these rocks, otherwise very rare in the world, his name entered the world literature. His works were cited by renowned petrographers P. Niggli and C. Burri, who referred to them as the first findings of the kind on the Balkan Peninsula.

During 1930 he explored the volcanic region of Zletovo and Kratovo. Another important finding by Tomić was printed in 1939 and it is related to the mount Kozjak near Kumanovo where he discovered and described another rare, in our country as well as in other parts of the Balkans, and unknown rock – *bostonite* (alkali *trachyte-aplite*). During the relatively short scientific career, Tomić concurrently studied *crystalline schists* of Belasica, Ograždeni, Osogovo, Plačkovica, Kozjak and Stara planina.

Tomić did not publish many works although they represent a considerable contribution to our petrographic science. He paid special attention to chemical research of rocks, keeping abreast of the latest scientific developments in France and introducing them into Serbia.

Author: *Jović, Vidojko*

Jovan TUCAKOV
(1905–1978)

Jovan Tucakov was born on January 24, 1905, in the village of Čurug, in Vojvodina, into a farmer's family. He finished elementary school in his birth place and the Grammar School in Novi Sad, in 1924. He graduated from the School of Pharmacy in Zagreb, in 1928 and was granted a military scholarship for specialization in France. There, at the School of Pharmacy of Nantes University, he defended his doctoral thesis entitled *Contribution a Vetude des tanins vegetaux* with the top grade, and became an honorary laureate of Nantes University. The same year his doctoral dissertation was published at the expense of the French Government. He also finished specialization in bromotology at the Laboratory for food products, drug testing and clinical analysis.

Upon his return to Yugoslavia, he accepted a position of a medical officer and went to Skoplje, Macedonia, where he founded and was the Head of the Chemical Laboratory of the Military Hospital, 1934–1940. In Skoplje, his knowledge, organizational skills and public service activities came to prominence.

During the academic 1939–40 year, upon demobilization from the military service, he was appointed assistant professor at the newly established Pharmaceutical Department of the Medical School, and in 1945 he was appointed assistant professor at the School of Pharmacy, University of Belgrade. He was elected associate professor in 1950, and full professor in 1957. He held the post until his retirement in 1975.

As well as being Director of the Institute of Pharmacognosy, Jovan Tucakov served as the Director of the newly established Institute for Research of Medicinal Herbs in Belgrade until 1973. So far, he was the only member of the Serbian Academy of Sciences and Arts who also was a pharmacist. He was elected corresponding member of the Academy in 1961, and full member in 1974.

Jovan Tucakov is the founder of pharmacognosy in Serbia. During almost five decades of his scientific activities, he conducted a variety of field and laboratory studies of the local medicinal flora. He prepared and elaborated pharmacognostic maps of Serbia based on his study of wild plant species. Jovan Tucakov was first to perform systematic introduction of plant species that did not exist as a culture in a particular region in our country. He facilitated development of plantation production of plant species that are used in the pharmaceutical industry. His cooperation with other botanists on the protection of endangered plant species gave favourable results. Jovan Tucakov was a tireless researcher of our folk terminology pertaining to plants and the traditional medicine. His years' long professional cooperation with our other eminent ethnologist greatly benefited this scientific discipline.

The field of interest and work of Jovan Tucakov was very wide. As a Univeristy professor, he produced the textbooks *Pharmacognosy* (1948 and 1964), and *Exercises in Pharmacognosy* (1948) for his students. He wrote, on his own or together with his assistants, nearly 600 papers; conducted some 200 studies and projects; and drew about the same number of pharmacognostic maps of different areas of Serbia, Montenegro, Bosnia and Macedonia. His most important books are *Medicinal Raw Materials in Vojvodina* (1950), *Psychosuggestive Elements of Svrljiški Timok* (1965), *Introduction of Medicinal Herbs in Serbia* (1970), *Medicinal Flora of Ovčar, Kablar and Jelica* (coauthor with Milena Mihajlov), (1975), and *Medicinal Herbs of Fruška Gora* (1978). Among

his books for popular use, the one that stand out is *Treatment by Herbs – Phytotherapy* (1970) which has had six reprints since 1960. Tucakov enjoyed great respect within the Serbian, Yugoslav and foreign scientific communities. He was a great enthusiast, a man of remarkable drive, energetic public life activist, and above all, a noble and well-liked man.

Jovan Tucakov died on September 22, 1978, and was buried in the Lane of the Great of Belgrade's New Cemetery.

Author: *Mihajlov, Milena S.*

Panta TUTUNDŽIĆ
(1900–1964)

Panta Tutundžić was born in Belgrade, in 1900. He finished his elementary and secondary education in Belgrade. He began his studies at the Technical School in Belgrade, the Engineering Department in 1920, and completed them in Berlin, at the School of Technical Chemistry, in 1925. He obtained his Ph.D. in chemical engineering in 1926.

In 1926, he was elected assistant professor of physical chemistry and electro-chemistry at the Technical Faculty of Belgrade University. He was elected associate professor in 1934 and full professor in 1948, at the same Faculty. He was a part-time professor at the Faculty of Natural Sciences and Mathematics (1952–57) and the Faculty of Electrical

Engineering in Belgrade (from 1957). He was the first Dean of the Faculty of Technology (1948–1952) and also a Vice-rector of Belgrade University (1954–1956). He was elected corresponding member of the Serbian Academy of Sciences and Arts in 1958 and full member in 1969.

For his research and pedagogical achievements and contribution to science and technology, Tutundžić received many awards and honours, among which were *the 7th of July Award* (1960), *the Nikola Tesla Gold Plaque* (1961), and was elected a life-long honorary president of the Serbian Chemical Society (1962) and an honorary member of the Societe de Chimie Industrielle (1963). He was president and member of councils, boards, and committees of scientific, educational and social organizations and funds; Editor-in-Chief and editor of many bulletins and encyclopedias at home and abroad; member of the editorial board of the international journal for analytical chemistry *Talanta* and member of national commissions and delegations for international cooperation. He gave many lectures, as a guest, at a number of Europe's renowned universities, scientific societies and academies. He presented his scientific results at international congresses and seminars in Stockholm, Lisbon, Paris, Munich, Leipzig, London, Belgrade, Zagreb and Ljubljana.

Tutundžić had 97 scientific papers published in journals all over the world; 10 books, 7 studies, a number of essays and articles, over 900 abstracts for encyclopedias, gave over 70 public lectures at the Kolarac Adult Education Centre and the like, and over 100 presentations at scientific meetings in different countries. His work was mostly related to electrochemistry; he introduced this discipline in our scientific circles and laid the foundations for the setting up of the Belgrade School of Electrochemistry that acquired world renown.

His greatest accomplishments achieved on his own or with his associates, pertain to electroanalytic chemistry, especially to coulombometric titrations and potentiometric study of nonaqueous systems. He made an original contribution to the development of iodinometry, argentometry, metallometry, etc., indirect coulombometric titrations and coulombometric study of multicomponent systems. Many scientists have accepted Prof. Tutundžić's ideas regarding the introduction of coulomb as a universal standard in analytical chemistry, and his *coulomb as universal substance in analytical chemistry* is on permanent display at the Palace of Science in Brussels.

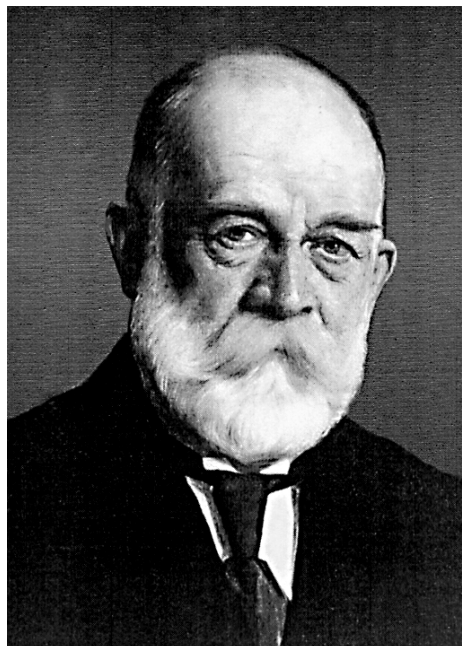
Potentiometric study of liquid non-aqueous systems, complementary to the existing methods of physico-chemical study, led to more adequate comprehension of the properties of reference and standard electrodes in nonaqueous conditions.

Prof. Tutundžić considerable enhanced chemistry and metallurgy with his study work of natural and mineral waters of Serbia, and electrometallurgical study of oxide-copper ores and classification of rare minerals in the ashes of domestic coals. His research work also contributed to the development of metallurgy, balneology, geochemistry and geology in our country. He initiated many young associates into scientific research. Most of his assistants became distinguished scientists; three of them became members of the Serbian Academy of Sciences and Arts.

As Vice-rector of Belgrade University, Tutundžić very much helped its development. He was also an enthusiastic pioneer, organizer and a long-standing Dean of Technological Faculty. All development phases of this Faculty, beginning with the establishment of the Technological Department at the pre-war University, and ending with the building of Technological Faculty in line with European standards of the time, are linked with the name of Prof. Tutundžić. He was a brilliant orator whose lectures were attended by students from other faculties, and an excellent pedagogue whose many students became distinguished scientists, and university professors. Under his direct supervision nine candidates defended their doctoral dissertations.

Special praise goes to Prof. Tutundžić for his contribution to scientific societies and associations, and for popularization of science. He served as president of the Serbian Chemical Society for many years, and it earned him the life-long honorary presidency at the same society. He facilitated the establishment of the Union of Chemical Societies of Yugoslavia, was a co-founder and the life-long president of the Yugoslav Nikola Tesla Society, and a member of many other scientific circles.

Author: *Putanov, Paula*



Sava UROŠEVIĆ
(1863–1930)

Sava Urošević was the most prominent mineralogist and petrographer in Serbia in the first three decades of the 20th century. He was born on January 31, 1863, near Soko Banja. His education began in Aleksinac and ended in Belgrade. Between 1880 and 1884 he studied at the Natural Sciences and Mathematics Department of Belgrade College. In 1885 he continued his education in Paris, studying mineralogy, chemistry and physics with the best known mineralogists and petrographers of that time – A. Michel-Levy and F. Fouque. After graduating in 1888, he returned to Belgrade where he first taught at secondary schools. He was elected professor of mineralogy and petrography in 1890, and member of the Serbian

Academy of Sciences in 1904. Sava Urošević was a co-founder of the Serbian Geological Society (1891), Rector of Belgrade University (1908–1910), President of the Educational Board, Head of the Mineralogical Section of Belgrade College, and member of the French Mineralogical Society.

Alongside his scientific and pedagogical work, he was also very committed to popularizing education. He was the founder and President of the Cultural League. During World War I, he lived in Paris where he worked with students from Serbia, for which he was decorated with the *French Legion of Honour Medal.* After his return to Serbia following the end of the war in 1919, Urošević set out to bring some order into the chaos caused by war destruction before he commenced scientific research.

He retired in 1928 and died in Belgrade, on September 14, 1930.

Sava Urošević studied almost all *granitoid* massifs and *crystalline schists* in Serbia, including contact metamorphic rocks around *granitoid* intrusion. Although these *schists* had been studied by most geologists operating in Serbia (Herder, Ami Boue, Žujović) it was Urošević who classified them, determined their range, stratigraphic position, age and composition. *Crystalline schists* are very wide spread in Serbia, and Urošević established that some of those *schists* are of Paleozoic age and others are contact metamorphic rocks resulting from *granitoid* intrusion. He synthesised the results of his explorations into several monographs which to this day have provided the basis for the study of these rocks.

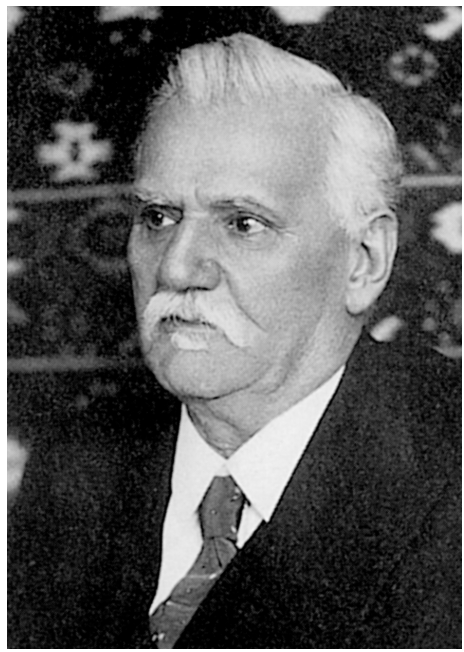
After several years of research of *crystalline schists*, Sava Urošević arrived at a number of conclusions which he exposed in his opening speech at the Academy of Sciences - *One View on the Origin of Crystalline Schists* (1911). He established the existence of three different types of terrains in Serbia: pure contact metamorphic terrains (Boranja, Kopaonik), crystalline schists (Juhor, Crni Vrh, Stalać hills), and mixed terrains (Cer, Bukulja, Poreč-Peč areas). He explained the underlying cause of the creasing of schists (geodynamic forces), and studied in more detail the process of development of contact metamorphic rocks (through action of intrusive rocks) and crystalline schists. He explained the genesis of crystalline schists as being an effect of polymetamorphic transformations of primary (magmatic and sedimentary) rocks.

Although he was professor of mineralogy and petrography, and a writer of mineralogy textbooks, his works in mineralogy are less numerous than those in petrography. They were for the most part published in the German journal *Zeitschriftfuer Kristallographie und Mineralogie.* In *biotite* crystals from Džep and Brestovačka banja, he discovered a new type of twinning which he named the *Serbian twinning*.

At the turn of the century, Urošević published his first textbooks *Mineralogy – Part I,* Geometric Crystallography, (1903) and *Mineralogy – Part II, Physical Crystallography*, (1910). After World War I, he wrote the new *Mineralogy* (1928) which included chemical properties, origin, classification and description of minerals, and a popular edition *of Precious Minerals and Gemstones* (1925).

Sava Urošević continued, and expanded, the mineralogical and petrographic studies started by Jovan Žujović, his mentor and the founder of geological school in Serbia. He was one of those pioneers who marked the golden era of Serbian geology.

Authors: *Jović, Vidojko; Karamata, Stevan*



Vladimir VARIĆAK
(1865–1942)

Vladimir Varićak was born on March 1, 1865, in the village of Švica near Otočac in Croatia, into a family of Serbia descent. He attended elementary and secondary schools in Sisak, Petrinja and Zagreb. During 1883–87, he studied mathematics and physics at the Faculty of Philosophy, Zagreb University. He became an advanced university student in 1887, and passed professorial exam in mathematics and physics in 1888. In 1891 he completed his Ph.D. thesis, and in 1995 became a senior lecturer. He spent the first ten years of his career working in secondary schools in Zemun, Zagreb and Osijek, and in the School of Navigation, in the town of Bakar. In October 1889, he became a profes-

sor of mathematics at the Faculty of Philosophy in Zagreb, where he stayed until 1936, when he retired. He later continued lecturing there, until he died on January 17, 1942, as a part-time professor. He worked at the same faculty for 42 years.

Vladimir Varićak was a member of the Yugoslav Academy of Sciences and Arts, the Czech Academy of Sciences, the Serbian Academy of Sciences; the Croatian Society of Natural Sciences and the Yugoslav Mathematical Society. In 1925 Varićak competed for the Lobachevsky prize, and received a diploma from the Physical-mathematical Faculty of Kazan for his input to Lobachevskian geometry and its application to Einstein's theory of special relativity. Varićak taught mathematics at secondary school and university levels. His influence on our two renowned scientists – Milutin Milanković and Djuro Kurepa – a secondary school teacher and a university lecturer, respectively was profound. In his memoirs Milanković wrote: *Of all teachers, Varićak had the greatest influence on me*. And Kurepa, Varićak's most outstanding student and associate, described his lectures as follows: *In those days there were few universities in the world where one had the opportunity to learn about so many things in lectures given by a single person*.

In his work, Vladimir Varićak focused energy and attention to investigating Lobachevskian geometry and special relativity, and to studying the life and work of Ruđer Bošković. In studying Lobachevskian geometry Varićak at first relied on the Poincare model. Later, he suggested and developed a specific approach to this subject. He derived the equations of straight lines and planes, equidistant lines and surfaces, limiting circles and limiting spheres. He also studied various transformations in Lobachevskian plane. His work was characterized by a clear geometrical idea, which was first realized on some conveniently chosen specific cases, and then generalized. After that, by analyzing a general case, Varićak was able to find many new and interesting special cases. In 1907 Varićak published a paper entitled *First Founders of Non-Euclidean Geometry,* where he gave not only a historical review of the development that led to the discovery of non-Euclidean geometry, but also analyzed the consequences of that discovery, with a very detailed and convincing discussion of important and critical moments of the development.

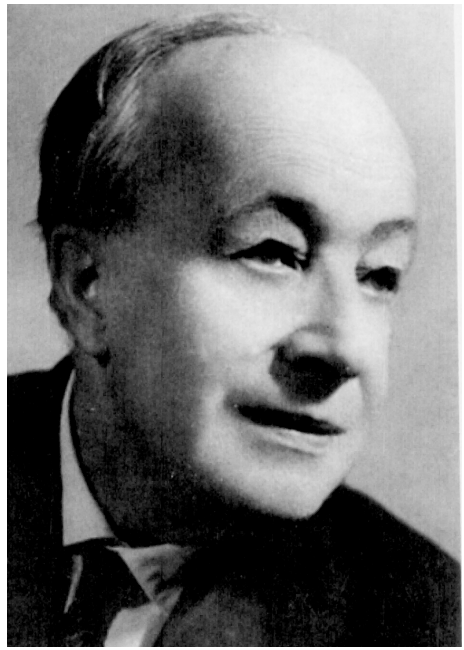
As an expert in non-Euclidean geometry, Varićak was able to recognize, very soon after the discovery of special relativity (SR), a specific connection between the new mechanics and non-Euclidean geometry. When Sommerfeld, by the end of 1909, interpreted SR with the help of geometry on a pseudosphere, Varićak clearly understood that this unusual geometry is nothing else but a representation of Lobachevskian geom-

etry. In the next two years he published five papers on the non-Euclidean interpretation of the new theory. These papers represent the basis of his contribution to the non-Euclidean interpretation of SR, a subject he continued to work on for nearly next thirty years. Varićak's work was well known to his contemporaries.

In his studies of SR Varićak tried to replace Euclidean geometry of the classical mechanics by three-dimensional Lobatschevskian geometry, thus obtaining many important results of SR. On the other hand, it was clear very early that the geometrical structure of SR is best described by four-dimensional Minkowskian geometry. A critical analysis of Varićak's ideas showed that the structure of three-dimensional Lobatschevskian space was not sufficient to describe all the events of four-dimensional Minkowskian space, while Lobatschevskian geometry served well to describe the space of velocities. Although in many cases the two interpretations lead to the same results, they are not mathematically equivalent. The main contribution of Varićak's work lies in his understanding that SR demands a non-Euclidean interpretation, which was very difficult to accept in the early days of this theory, and also in his attempts to develop a systematic, non-Euclidean interpretation of SR, in spite of the fact that these attempts were only partially successful.

Varićak investigated the life and work of Ruđer Bošković with great interest. He studied historical documents about Bošković's stays in Milan, Rome, Vienna and other European towns, and published about twenty papers on that subject. From Varićak's papers about Bošković one can learn a lot about Varićak himself. In his studies of Bošković's mathematical work, Varićak used a specific methodology that was very appropriate for the history of mathematics. His investigations of Bošković's life and work were recognized by the international scientific community.

Authors: *Prvanović, Mileva; Blagojević, Milutin*



Konstantin PETROVIČ VORONJEC (1902–1974)

Konstantin Petrovič Voronjec was born on January 30, 1902, in Kiev. His father, Petar Vasiljevič Voronjec, was a well-known Russian scientist and expert on mechanics (dynamics of nonholonomic systems), and a professor at the Kiev University. After completing the elite Kiev Grammar School, Konstantin Voronjec was mobilized by the White Army, and he fought in some of the most difficult battles against the Red Army, during 1919-1920. After the defeat of the White Army, together with thousands of other refugees he escaped to Belgrade, Serbia.

In Belgrade, he graduated mathematics and physics from the Faculty of Philosophy. For a short while he taught at Kruševac Grammar

School. At the end of 1920 he returned to Belgrade to work on his doctoral dissertation entitled *Rolling of a Solid Body over an Elastic Support*, which he defended in 1930 (members of the exam board were Anton Bilimovič, his mentor, Milutin Milanković and Mihajlo Petrović). After that he went to Paris, France, and accepted a position at the Institute of Fluid Mechanics at the French Air Force Ministry. In France, under the mentoring of Prof. Henri Villat at the Faculty of Science of Paris University, he defended another doctoral dissertation that consisted of two parts; one relating to the stability of convective fluid flows, the other to the fluid flow in thin layers over curved surfaces.

At the end of 1935, Voronjec returned to Belgrade, and failing to secure a suitable position at University, he accepted employed with an insurance company where he worked for 12 years. In 1947 he joined the Mechanical Engineering Department of the Technical Faculty and in 1954 he was elected full professor. He was the only Russian refugee who, having graduated at Belgrade University and having spent most of his career working in Yugoslavia, became a member of the Serbian Academy of Sciences and Arts – he was elected corresponding member in 1958 and full member in 1963. He retired in 1971, and died on October 19, 1974.

Apart from the topics which Voronjec addressed in his doctoral thesis, he also studied the so-called hydraulic analogy, i.e. analogy between incompressible and compressible fluid flow, problems of hydrotechnics**,** gas dynamics, and the application of non-analytic functions and monogenic quarternion (parameters) in fluid mechanics. Voronjec displayed a straightforward physico-mathematical approach to a problem and its exact mathematical treatment for which he used a highly developed mathematical apparatus. Respectively, he used the so-called inverse methods for solving problems of fluid flows. He published 43 scientific papers and 4 university textbooks: two for graduate and two for post-graduate studies.

Voronjec was very active at the Faculty of Mechanical Engineering. He was a co-founder, and an active member, of the Yugoslav Society for Mechanics (posthumously he was awarded an honorary membership of the Society) and the Department of Mechanics of the Mathematical Institute of the Serbian Academy of Sciences and Arts. For some time he served as the chairman of this Department and headed mechanics study group at the Faculty of Natural Sciences and Mathematics in Belgrade.

Authors: *Saljnikov, Viktor; Djordjević, Vladan*

Pavle VUJEVIĆ
(1881–1966)

Pavle Vujević was born in Ruma, on August 22, 1881. He completed his elementary and secondary education at the Serbian Orthodox Grammar School in Novi Sad, in 1889 before enrolling at Vienna University, and its famed School of Geography where he defended his doctoral thesis entitled *Die Thesis eine potamologische Studie*, in 1904. His mentor was the famous geomorphologist Albrecht Penck while one of the members of the exam committee was Julius von Han, ranked as one of the leading climatologists of his time. During 1904-1905 he specialized in meteorology and climatology at the Prussian Meteorology Institute in Berlin and the meteorological station at Potsdam.

In March 1907 he was elected assistant at the Department of Geography, Faculty of Philosophy of Belgrade University. He was elected associate professor in 1919 and full professor in 1921. He was director of the Meteorological Observatory of Belgrade University from 1924 to 1947. Since the establishment of the Institute of Meteorology and Climatology, within the Faculty of Natural Sciences and Mathematics, in 1947, Pavle Vujević was its director and the Head of the Meteorological Department until he retired in 1955. He was director of the Jovan Cvijić Institute of Geography of the Serbian Academy of Sciences and Arts, from February 1, 1958 to May 31, 1961. He was elected corresponding member of the Serbian Academy of Sciences and Arts in 1950 and full member in 1958. He died in Belgrade, on November 17, 1966.

The scientific career of Pavle Vujević lasted 60 years. He devoted most of his career to pioneering research. With his Ph.D. thesis *Die Theiss eine potomologische Studie* he laid foundations for the study of rivers – a new physical-geographical discipline in Serbia. However, after being appointed assistant professor for the subjects of climatology and meteorology, he devoted himself almost totally to the study of these two disciplines. His early research into the soil temperature and lower air layer in Belgrade, rightly considered masterpieces, made him a pioneer of microclimatology, the scientific discipline which in many developed centers of Europe at that time was still in its infancy. His acquired international reputation by studying microclimatology and secondary climatic variations.

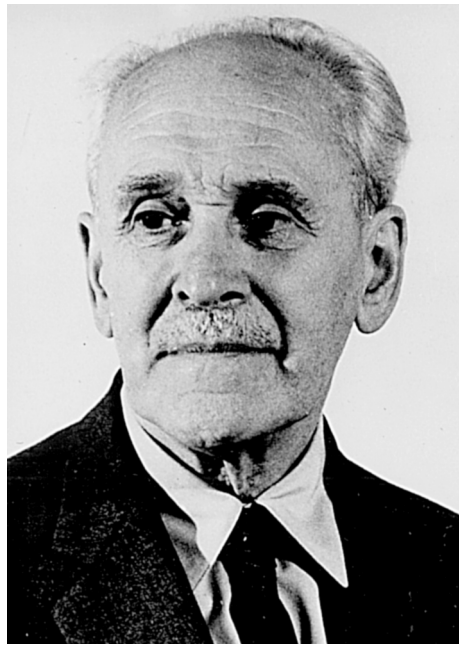
Vujević believed that different influences of the land and the sea on air, their impact on atmospheric circulation (considered the *cardinal meteorological phenomenon* during the last decade) and the effect of the relief on the climate, determine the formation of climatic conditions and occurrences in Southeastern Europe. Thus, his works on general and regional climatology provided a realistic picture of complex climatic conditions on the Balkan Peninsula. He provided precious guidance to young generations of scientists regarding different theoretical and practical climatological and meteorological research profiles. Pavle Vujević was the first Yugoslav climatologist who explored bioclimatology, namely, influences of the climate on the human body and living creatures in general. It may well be said that, with the study of the climate of Belgrade, Pavle Vujević initiated the study of climate of big cities in Yugoslavia.

Vujević was a man of broad education and culture. He had a good mastery of foreign languages, an amazing gift of observation and enormous energy. He easily found his way in modern scientific trends and was highly regarded by colleagues in renowned scientific centers of Europe and in international geographical and meteorological associations. For his

scientific and pedagogical achievements, Vujević received many domestic and foreign awards and honours.

Pavle Vujević worked with Jovan Cvijić and was a co- founder of the Serbian Geographical Society (1910). Together with Milan Nedeljković, he established contemporary climatology and meteorology in Serbia. Pavle Vujević, with his achievements that marked the national and world science, is rightly considered to be one of the most eminent Serbian scientists of the first half of the 20th century.

Author: *Rakićević, Tomislav L.*



Pavle VUKASOVIĆ
(1893–1973)

Pavle Vukasović was born on July 15, 1893, in Zaječar, Serbia. He completed elementary school in Požarevac and Grammar School in Belgrade, in 1912. His further education was interrupted by the Balkan Wars in which he participated as a volunteer-orderly. He also went to World War I with the medical corps of the Serbian Army.

After the War, he went to Toulouse, France, where he studied at the Faculty of Agriculture between 1918 and1924, obtaining a diploma in agronomical engineering. He also acquired a diploma from the Department of Biology, the Faculty of Philosophy, and in 1921 he defended his doctoral thesis in the field of entomology entitled *Contribution a*

l'etude de 1'Eudemis (Polychrosis botrana Schiff.) de la Pyrale de la Vigne (Oenophthira pilleriana Schiff.) et de leurs parasites. He won a Rockefeller scholarship and during 1926/27 he specialized in Paris in the field of parasitology, medical and agricultural entomology. From 1926 to 1954 he was the Head of the Department of Phytopathology, and the Parasitology Department of the Institute of Hygiene in Belgrade. In 1954, Pavle Vukasović was appointed full professor at the newly founded Faculty of Agriculture in Novi Sad. He retired in 1964 and died on November 21, 1973, in Belgrade, at the age of 81.

Scientific career of Dr. Vukasović lasted 53 years. His activities within the Serbian Academy of Sciences and Arts began in 1949 while he was an assistant at the Institute of Ecology. At the Academy he headed a research group studying entomofauna of Serbia. Engagements of Pavle Vukasović were wide and diverse. He published 130 scientific works, mainly in the field of entomology, out of which 53 were published abroad (mainly in France) and which could be classified into four groups. The first comprised over 40 reports pertaining to the study of entomophagous parasite insects, natural enemies of pests. He studied a number of species of harmful insects. These works, his doctoral thesis also belongs here, the first studies of this type in Serbia, present a most valuable scientific contribution. The second groups of his works (about 50) dealt with the anatomy, biology, ecology, and measures for protection against numerous species of pests of different cultivated plants. The third group of works (over 20) explored the most frequent pests in stored products. The fourth group contained works dealing with the medical entomology, mainly studies of the malaria mosquito *(Anopheles macu-lipennis Meig*.) the latter greatly contributing to eradication of malaria in Yugoslavia.

Vukasović enriched the science of entomology and promoted its application in agriculture and human medicine. His contribution to the development of this particular scientific discipline in Serbia made him the most distinguished entomologist of the 20th century. He lectured zoology and entomology at the Faculty of Agriculture in Novi Sad from 1954 to 1963 and was the Head of the Department for Plant Protection. Under his guidance and supervision 10 generations of agronomists, especially experts in plant protection, were educated. Vukasović was highly regarded as an outstanding teacher and pedagogue. He was mentor to ten candidates working on their doctoral theses. He also taught medical entomology at specialization courses for physicians and gave many lectures on malaria that were organized in Belgrade, under UNESCO auspices.

Vukasović earned reputation for his achievements in the area of applied science, trying persistently to bring together academic and practi-

cal work. He promoted cooperation between agricultural and health institutions, advised farmers on practical issues, published many textbooks, scientific papers and articles for general public. He wrote or co-wrote 28 books among which a special mention deserve *Most frequent fruit pests,* 1933, *Pests in plant production* (first part was published in 1964, second part in 1967), *Pests in Storehouses,* 1972. Along with books, Vukasović published about 30 scientific papers and nearly 500 articles for general public. He was a co-founder of the Serbian Society for Plant Protection and served as its president for a while. Enormous was his theoretical and practical contribution to the development of agriculture in Serbia in the 20th century, particularly in the area of plant protection.

Vukasović received many awards and honours for his achievements. The Serbian Academy of Sciences and Arts in 1933 granted him a special award for his book *Most Frequent Fruit Pests*. He was appointed corresponding member of the Serbian Academy of Sciences and Arts in 1965 and full member in 1972. As a token of high esteem for his enormous scientific, pedagogical and professional work, the Institute for Plant Protection of the Faculty of Agriculture in Novi Sad now bears his name.

Author: *Čamprag, Dušan*

Zoran P. ZARIĆ
(1929–1985)

Zoran Zarić was a scientist, engineer and teacher. As a scientist he tried his hand at several disciplines where his shrewdness and capability to grasp the abstract perception of modern science left an indelible mark. From the very beginning, his scientific craving for new knowledge was linked to the study and understanding of phenomena which take place in fluids flow. Contemporaneousness of every modern power plant system is manifest through its process intensification. This primarily applies to heat transfer intensification. Probability of intensification of heat transfer in channels of a convergent-divergent form appealed to Zoran Zarić so he started, very early, focusing his attention to the study of heat transfer and methods of its intensification.

In this research Zoran Zarić noticed that the problem of channel flows contained an unknown quality which, at the time, abounded with various approximations for its description. It was connected with the fluids channel flow turbulence. Having a profound understanding of the problem, Zoran Zarić was one of the first people who had courage to introduce a hypothesis about the existence of a fluid structure in channel flows. As an expert on experimental methods for measuring the speed of fluids, he turned his attention toward measuring of fluid turbulence in boundary layer. This research led Zoran Zarić to create a new concept of understanding turbulence which resulted in his name being included into an anthology of theory about fluids flow in boundary layer. Scientific works of Zoran Zarić, in the field of turbulent convection, aimed to explicate the influence of downstream pressure gradient on the mechanism of heat transfer intensification. Detailed experimental research, and the application of an original measuring technique and computer data processing, indicated the existence of general mechanisms of transfer process intensification which is based on turbulisation of boundary layer. The key to a deeper understanding of these processes lies in the explication of the physics of turbulent exchange along the wall, which needs to be studied more. Zoran Zarić contributed greatly to this field which, today, is the subject of extensive research in the scientific world. He was among the first scientists who applied digital estimation of velocity and temperature probability distribution in viscous sub-layer and who used the effects of short-lived, quasi-deterministic processes to describe patterns which had the form of the mentioned distribution. Having developed an original method of statistical analysis of this typically non-Gaussian processes, Zoran Zarić was able to quantitatively describe dominant role of the quasi-deterministic structures in the mechanism of the momentum and energy turbulent exchange. This undoubtedly proved inadequacy of Reynolds statistics in the analysis of the process of turbulent exchange, and established new approaches to the theory of turbulent flows.

Using his research, Zoran Zarić was first to explain that velocity and temperature probability distribution as a function of the wall distance was the result of the activity of intermittent phenomena, i.e. cyclic injection of the fast fluid and ejection of the slow fluid from the wall. In detecting intermittent phenomena Prof. Zarić first used the method of digital filtering in order to apply a method which was later developed as TERA algorithm (Turbulent Energy Recognition Algorithm). Compared to other methods of detection of intermittent processes which have been developed so far, TERA algorithm uses, as its basic criterion, detections of the gradient of a turbulent kinetic energy variation based on signals from a

single wire anemometer. TERA algorithm determines the beginning and the end of intermittent phenomena and also helps distinguish intermittent periods of injection and ejection of fluids from the basic turbulence of low level amplitude. Zoran Zarić demonstrated, experimentally, advantages of TERA algorithm over other methods of identification of coherent structures based on anemometric signals. Using comparative analysis of methods of detection, applied at the University of South California and Michigan State University, Prof. Zarić proved TERA algorithm to be the most reliable method of detection of turbulent flow structures. The algorithm was successfully verified in connection to the results of an independently carried out process visualisation, and it also helped detect all significant phenomena which assist in generating Reynolds stresses. Further works of Zoran Zarić concentrated on measuring of turbulence structures, primarily those next to the wall, in greater detail -to the order of one tenth of a millimetre. He further developed a suitable and original technique for measuring velocity and temperature fluctuation on the wall distance with a unique probe, having paid special attention to interpretation of signals and also gave a detailed explanation of flow structure and heat exchange by the wall. Zarić's input to the statistical theory of hot wire signals analysis was made public in reports by the French Academy and also at one international assembly. His work results were presented at six scientific gatherings and, by invitation, at two eminent colleges in Great Britain and four in the USA. The overall findings of Zoran Zarić have been collected in a monograph and are now included in the *Advances in Heat Transfer*. The results are significant because they proved the heat transfer intensification through downstream variable pressure gradient to be quite possible. More importantly, they indicated the general direction of intensification through turbulisation of the walls. Besides, an original measuring technique was developed and an interpretation of probe signals was theoretically established. A more profound comprehension of the intensification process depends on the understanding of turbulent exchange of the momentum and energy which is still insufficient and is based on inadequate statistical theories which date back to the end of the 19th and the beginning of the 20th century.

As an engineer, Zoran Zarić strived, from the very beginning of his career, towards creating and studying of new concepts of engineering systems. A concept of nuclear reactor devised by him and shown at the First Geneva Conference on Peaceful Utilization of Nuclear Energy, was based on a reactor core construction consisting of a set of spheres that were made of nuclear fuel and wrapped in graphite as a moderator, remains a technical solution which even developed countries are taking into consid-

eration and have also used it to build an experimental power plant system. Studying this type of reactor system, which uses nuclear energy for peacetime purposes, Zoran Zarić demonstrated a high level of understanding of power plant systems and their modern designs.

When the problem of environmental pollution became imminent for identification of interchangeable reaction between the environment and power plant objects, Zoran Zarić began researching the environment. He developed several models for numeric simulation of phenomena and processes which follow the release of combustion products into the environment. It must be pointed out here that his attention was particularly directed toward the analysis and evaluation of the impact which power plant systems, in Serbia had on the environment. His interest in the interaction of power plant systems and the environment lead him into simulating the impact which discharged cooling water from the thermal power plant had on river basins. With a group of assistants, Zoran Zarić developed a mathematical model for simulating discharge of the cooling water into a river basin and analysed the river course temperature range.

Zoran Zarić was an eminent professor of several subjects of modern mechanical engineering. However, it must be said that thermodynamics was the basis of all the subjects that he devoted himself to. He wrote a number of outstanding textbooks. Prof. Zarić was well liked by his students and he mentored several masters' and doctoral thesis in the area of his expertise. He lectured at the Faculty of Mechanical Engineering in Kragujevac, the Faculty of Electrical Engineering and the Faculty of Science in Belgrade, the Faculty of Mechanical Engineering in Zagreb and the Centre for Multidisciplinary Studies of Belgrade University. In 1964 he was elected assistant professor of thermodynamics at the Faculty of Mechanical Engineering in Belgrade, part-time professor in 1970 and full-time professor in 1978. In 1969 he was a visiting professor at London Imperial College. He lectured by invitation on twenty-three universities and scientific institutions in the USA, the USSR, Great Britain, Canada, Israel and India.

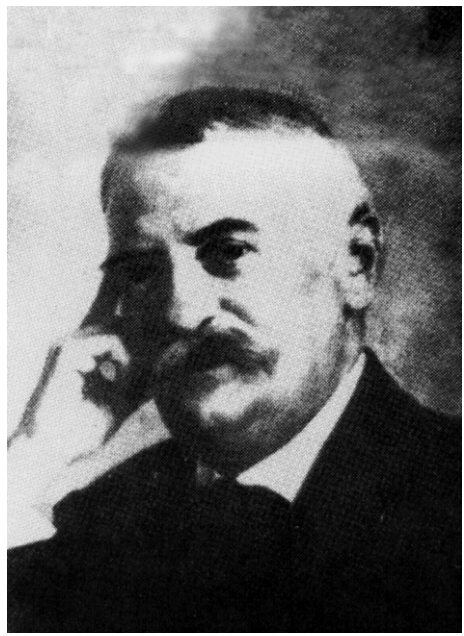
He received *the City of Belgrade October Award* in 1972 for his research work into the physics of turbulent flows. On November 16, 1978 he became a corresponding member of the Serbian Academy of Sciences and Arts.

Zoran Zarić developed extensive international activity. He enthusiastically participated in a large number of international conferences. He was Secretary General of the International Centre for Heat and Mass Transfer since its foundation. He initiated a number of events and organized many international meetings on behalf of the Centre. As a UNESCO

expert he participated in the founding of regional centres for Heat and Mass Transfer in Asia, Africa and Latin America and worked with groups which tried to solve problems of energetics in the future, in Tokyo, Detroit, Istanbul and Paris. Since 1969 he represented Yugoslavia at the International Assembly for Organizing World Conferences on Heat Transfer.

A caring father, Zoran Zarić loved his children Marko and Milana. He shared with them his very limited spare time. He took delight in their success from the early days. Sadly, he did not live long enough to see how they fulfilled his greatest wish and became honourable and worthy followers of his work.

Author: *Afgan, Naim*



Aleksandar ZEGA (1860–1928)

Aleksandar Zega was one of the most outstanding and fruitful chemists who lived and worked in Serbia at the end of the 19th and during the first decades of the 20th century. Following the completion of his studies in Switzerland, where he worked for a while, he spent the greatest part of his active service in Belgrade, at the Communal and Customs Laboratory.

He published about thirty works in domestic and foreign journals, mainly in the area of analytic chemistry. His most important works pertain to the analysis of food indigenous to Serbia and its climate, for which there were no standards in European manuals. He also simplified standard analytic methods.

Author: *Bojović, Snežana*

Vjačeslav ŽARDECKI
(1896-1962)

Biography – Vjačeslav Žardecki was born on April 16, 1896 in Odessa (Russia) into a family of Polish descent. He attended primary and secondary school in Odessa, and graduated from the Faculty of Physics and Mathematics, the University of Novorossia, Odessa, in 1917. He worked as a research assistant at the Astrophysics Department of this Faculty for a short while, but in January 1920 he left Russia for Serbia. In March, the same year, he was appointed research assistant at the Belgrade Observatory, and in March 1921 he became assistant at the Applied Mathematics Department of the Faculty of Philosophy in Belgrade.

In March 1923, he successfully defended his doctoral dissertation *On the Movement of a Solid Body along a Curved Line.* Early in 1925 he became assistant professor of theoretical physics at the Applied Mathematics Department of the same Faculty. In 1930, he was appointed associate professor, and in 1939 he was promoted to the rank of full professor for the same subject.

He retired from work during World War II, but in 1943 he went to Gratz University (Austria). In 1949 he moved to the United States and became professor of geophysics at Columbia University in New York. He died there in 1962.

Teaching and textbooks – Early in his teaching career, in 1927, the general curriculum and study courses at the Faculty of Philosophy were reorganized. Theoretical physics became an independent and for the first time a compulsory subject for students of physics. Zardecki held courses on the theory of vectors, hydromechanics and theoretical physics to students of mathematics and physics (3rd to 6th semesters). The second course - hydromechanics (started in 1925) – was the first such module taught at the Belgrade Faculty of Philosophy. Throughout that period Zardecki, together with Prof. Milanković, also run seminars on applied mathematics.

Žardecki published the following university textbooks:

a) *Hydromechanics* (lithography, printed copy), Belgrade 1932, and

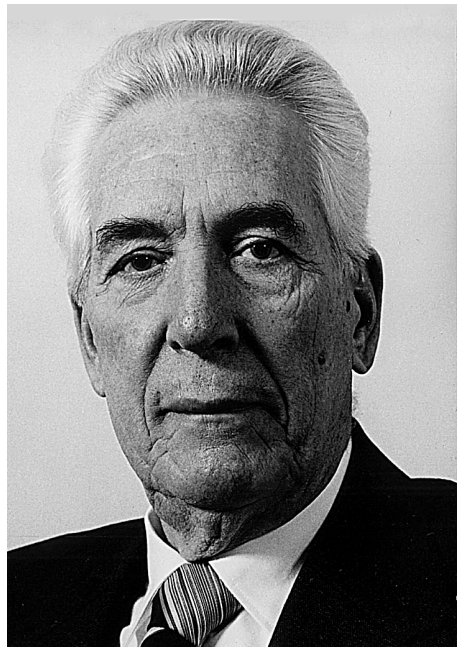
b) *Fundamentals of Theoretical Physics*, Belgrade 1941. The former was the first textbook on hydromechanics for students of natural sciences, containing some 166 pages, which primarily dealt with the mechanics of ideal fluids. The latter was the first complete course in theoretical physics at a higher mathematical level, containing about 400 pages, which basically comprised the entire field of theoretical physics.

Research works and papers – The scientific fields in which Žardecki engaged and produced significant results were hydromechanics, astrophysics and geophysics, rational mechanics, and less importantly theoretical physics. Accordingly, his works can be classified in the following groups: a) Papers on rational mechanics, b) Papers on hydromechanics, c) Papers on astrophysics and geophysics and d) Papers on theoretical physics. The first group dealt with various problems of the mechanics of systems and solid bodies, while the second one treated different issues in the area of mechanics of ideal fluids, pertaining mostly to the problem of the Earth's evolution. The third group elaborated on these problems, with reference to geophysical processes on the Earth's surface, as well as the

propagation and properties of the elastic waves in layered media. The last one discussed some general questions of theoretical physics, in view of their concept and logical structure.

He also wrote three monographs: a) *Mathematical Investigations of the Problem of the Earth's Evolution* (1935), b) *Theories on the Shapes of Celestial Bodies* (1958) and c) *Elastic Waves in Layered Media*, with two co-authors (1957). They present a systematic approach to these problems, with an elaborate presentation and discussion of results obtained from numerous other authors, including some original papers of the author himself. Among his written works, the most important ones are those from the second and third group which dealt with hydromechanics, astrophysics and geophysics, and focused particularly on problems of Earth's evolution as a celestial body. The above mentioned results stemmed from a hypothesis which assumed that the Earth in its original fluid state was not rotating en bloc, but rather the different Earth's zones had different angular velocities increasing from the pole to the equator. It should be pointed out that this theory has been accepted in scientific circles and as such provides satisfactory explanations of geophysical processes which occurred on Earth, such as the separation of the continents and their movements, and the origin of the oceans and mountain chains.

Author: *Mušicki, Djordje*



Branko ŽEŽELJ
(1910–1995)

Prof. Branko Żeželj, member of the Serbian Academy of Sciences and Arts (SANU), was born in 1910, in the town of Benkovac, Dalmatia. He was educated in Zadar and Split. He graduated from the Faculty of Technical Sciences, University of Belgrade, in 1932 after which he worked as a civil engineer-designer at the Bridge Design Department of the Ministry of Civil Engineering in the Kingdom of Yugoslavia. He stopped when World War II broke out in April 1941. Between 1941 and 1945 he was a prisoner of war in Germany. After returning from Germany, he helped with the repair works of the damaged and destroyed large bridges on the territory of Yugoslavia.

In 1948 B. Žeželj became the first director of the newly founded Federal Institute of Civil Engineering in Belgrade. In that capacity he worked on developing a new, Yugoslav system of concrete pre-stressing. In the same year this pre-stressing system was patented and gradually introduced in the Yugoslav building practice. He was a co-founder and the first director of the newly founded Institute for Materials Testing of the Republic of Serbia (IMS) (1952) where he worked until he retired in 1979.

Prof. Žeželj became a corresponding member of the SANU in 1961 and its full member in 1968. He was also a corresponding member of the Academy of Sciences of the Republic of Bosnia and Herzegovina.

The large opus of Prof. Žeželj's designed and realized works could be divided into four groups: industrial and other halls, bridges, prefabricated buildings and other structures.

A complex of four halls for the steel tube factory in Sisak (Croatia), with total working area of app. 16.000 m^2, built in 1951, was the first pre-stressed concrete building of a large size in Yugoslavia. After that Žeželj designed and built a complex of fourteen halls, approximately 26.000 m^2, for the cable factory in Jagodina (1952) and a similar factory in Železnik near Belgrade. All these halls were fully pre-stressed and prefabricated from foundation to the roof. The hall of the Split shipyard was built in 1953. This was also a fully mounted pre-stressed concrete building. Roof structure, 32 m in span, consists of prefabricated pre-stressed concrete trusses. Two years later Žeželj again used similar trusses as a roof structure on two hangars near Zadar, but this time the span was much larger, 61 m. The same trusses were later, in 1969, redesigned and used as a roof structure for the Sports Centre in Zagreb, Croatia.

The Universal Hall of the Belgrade Fair certainly is one of the best and the most successful of Žeželj's designs. The roof of the building consists of eighty concrete arches cast on the ground and erected on the final position. At the foundation, the radius of the hall is 107 m. At that time this exhibition hall was, for a short time, the largest concrete hall in the world.

Prof. Žeželj has designed numerous bridges but in this paper we will only mention three. The bridge over the Tisa River was built in 1957. This was the first large pre-stressed concrete bridge built in Yugoslavia. The main structure is a continuous beam with a slender arch over the middle span known as *Langer System*. The spans of the structure are 50 + 154 + 50 m. Approaching structures from both sides are simply supported beams 2 x 35 m. Total length of the bridge is 394 m.

Immediately after the Tisa Bridge, Žeželj designed a large bridge for railway and road traffic over the Danube in the city of Novi Sad. The

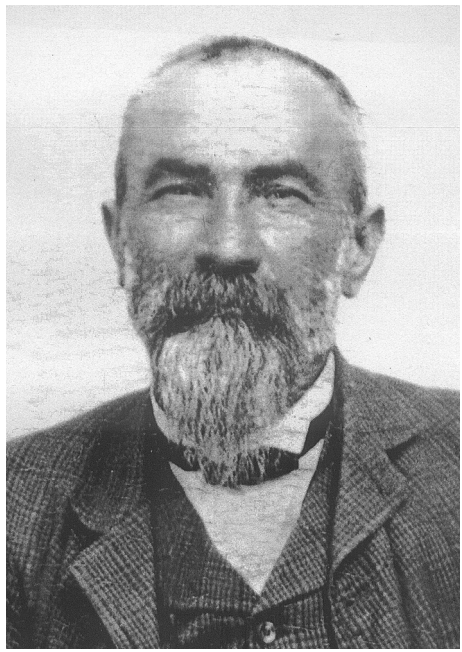
bridge consisted of two arches of unequal span of 211 and 167 m and was partially prefabricated and pre-stressed. The large arch was cast on a prefabricated concrete arch structure, to make the navigational profile of the Danube free. Soil behind the left support of the larger arch was replaced and pre-stressed with the use of a special hydraulic system. At that time, (1961), the Danube Bridge was one of the largest concrete arch bridges for railway traffic. The bridge was totally destroyed by the USA Air Force bombing in 1999.

The Danube Bridge near Beška, built between 1969 and 1973, was Žeželj's last bridge. The main structure is a continuous beam with spans of 15 + 105 + 210 + 105 + 15 m. Approaching structures, on the left bank of the river, are seven continuous beams with spans 5 x 45 m and one continuous beam of 5 x 45 m is the approaching structure on the right bank of the Danube. The total length of the bridge is 2.250 m. The bridge is a fully pre-stressed concrete structure. It is interesting to mention that bridge was built without any scaffolding in the river. Instead, Žeželj used a light steel platform suspended on the finished part of the structure and connected to concrete and pre-stressed part of the remaining cross section of the construction.

In 1958 Žeželj started designing and developing a prefabricated system of dwelling structures. Unlike the inflexible systems widely used across Eastern European countries, Žeželj designed a system that consisted of several principal parts, similar to the well-known LEGO cubes. The main elements of the system (*IMS System*) are floor-slabs, columns, staircases and cantilever slabs. Structural elements are connected by prestressing. In this way architects are completely free to design buildings of very different heights, plans and appearances. The system is widely used in cities of the former Yugoslavia but also in Cuba, Ethiopia, Egypt, the USSR, Hungary and China as well as in Italy, Austria and the Philippines. The Žeželj-IMS System was specially designed and tested to withstand strong earthquakes.

Beside large structures, Prof. Žeželj also worked on different so-called *small* structures such as railway sleepers. More than two million of Žeželj sleepers have been built into the Yugoslav railway system.

Author: *Petrović, Boško*



Petar ŽIVKOVIĆ
(1847–1923)

The author has attempted to present the life and work of mathematician Petar Živković, one of the leading proponents of mathematical, scientific and educational activities in Serbia at the turn of the last century. According to him, Živković was one of the first people in this country who conducted serious, systematic work in the field of mathematics, while on the other hand he devoted much of his energy trying to organize pedagogical activities, and teaching of mathematics and physics at the secondary school level. In the text that follows, the author offers facts which support his statements.

Petar Živković was in 1847, in Zaječar, Eastern Serbia. His father, most probably a man of business, was fairly prosperous which enabled him to finance his son's education at home and abroad. Petar Živković finished primary school in his birthplace in 1858, started his secondary schooling in Negotin, and completed it in Kragujevac, in 1864. Motivated by his love of mathematics and technical sciences, he enrolled at the newly established Technical Faculty of Belgrade University, graduating after three years, in 1867. Wishing to expand his knowledge, he enrolled at the renowned Zurich Polytechnic. He commenced his studies at the Mechanical Engineering Department but after one year, dissatisfied with not having more mathematics in the syllabus, he moved to the Mathematics and Physics Department (where twenty years later Albert Einstein and his wife Mileva Marić also studied). On his return to Serbia, he tried unsuccessfully to secure a teaching position at University. Then, in 1872, he was appointed teacher of mathematics at the Teachers' Training College in Kragujevac, where he taught until 1877.

He spent a year at the Grammar School in Zaječar, after which he was transferred to Belgrade Grammar School to teach mathematics, physics and mechanics between 1878 and 1888. During that period he began publishing various articles and texts which, having acquiring the status of scientific works appeared in the "Glasnik" of the Serbian Learned Society. His scientific and pedagogical achievements earned him membership of the Serbian Learned Society in 1883. Following the foundation of the Serbian Royal Academy of Sciences, which the Serbian Learned Society merged with, Živković became its correspondent member in 1883. Just prior to the start of the 1888/1889 school year, he was appoin-ted Principle of the Užice Grammar School, and in 1894 Principle of the Valjevo High School, where he remained until he retired in 1904. Nevertheless, even after his retirement from public services, Živković continued working as the Principle of a private Grammar School for Girls in Valjevo until it closed down in 1912. He enjoyed his work, and was very good at it, as an educator, school principle, and the writer of books on pedagogy.

His articles continued appearing, with some minor interruptions, in the "Glasnik" and also in the "Glas" of the Serbian Royal Academy of Sciences until the end of his life. He published altogether nine such works. Živković thoroughly elaborated on the problems of synthetic, analytical and elementary differential geometry. Following a mild controversy which resulted in a relatively unfavourable assessment of his work voiced a few years ago by academician Miodrag Tomić, the prevailing opinion insisted on the above stated positive quality of his work and on

the idea that the pioneers of scientific work in this country in the 19th century, in view of the conditions in which they worked and the point of departure from which they started, should be assessed by special criteria, different from the absolute and highest ones. Everything said, the pioneer mathematician Petar Živković deserves a modest, albeit not insignificant, status.

By working in secondary schools in various parts of Serbia, where he spent the best forty years of his career trying to promote, modernize and enrich the country's system of education, Živković earned an equally honourable and prominent standing.

Attached to the text about the life and work of Petar Živković is a bibliography of his published works.

Author: *Adamović, Dušan*

Svetislav ŽIVOJINOVIĆ (1907–1966)

Prof. Svetislav Živojinović was born on August 7, 1907, in the village of Čenta, Zrenjanin district. He completed elementary and secondary schools in Belgrade. In 1929 he enrolled at the Faculty of Agriculture, Department of Forestry, in Belgrade (Zemun) and graduated from it in 1931. During 1932/33 he specialized under Prof. Mihajlo Gradojević at the Faculty's Institute of Applied Zoology and Entomology. In 1935 he was appointed assistant for the subject of entomology and worked there when World War II broke out.

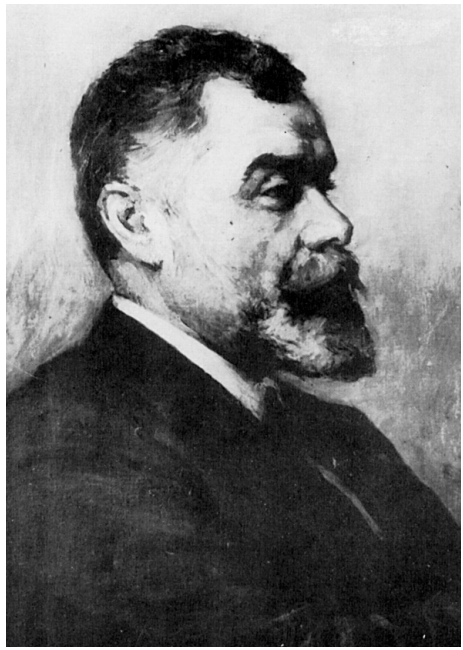
He defended his doctoral dissertation at the Faculty of Agriculture and Forestry in Belgrade, in 1940, thus becoming the first Serb to be

awarded a Ph. D. in forestry from that faculty. In April 1941, he was taken prisoner of war as a reserve officer, and sent to Germany, where he remained until 1945. After returning to the country, he resumed his teaching activities and helped the reconstruction of the Faculty which was completely demolished during the war. In 1946 he was appointed assistant professor for the subjects of forestry and entomology, associate professor in 1950, and full professor in 1954. He was also the first engineer and doctor of forestry to be elected, as a corresponding member, to the Serbian Academy of Sciences and Arts, in 1963.

The scientific output of Prof. Svetislav Živojinović was diverse and extensive. His interest revolved around entomofauna, biology and ecology of forest insects' pests, as well as methods of pest control. He wrote textbooks, manuals and brochures on the subjects of forestry and entomology, and worked hard towards popularizing entomology as a scientific discipline, organizing research work and educating future scientists. In the course of his successful career, Živojinović published 128 scientific articles and reports and he launched the study of entomofaunistic in Serbia. In his doctoral dissertation he used a collection of insects gathered on the University property in Majdanpek, the area that spreads over 8.000 hectares of mainly forest land. During the six-year research period, he studied 2.270 insect taxa (14 orders and 177 families). This classified collection, numbering over 60.000 specimens, is housed at the Faculty of Forestry of Belgrade University and is used by students and researchers of entomology.

Prof. Svetislav Živojinović tragically lost his life, in a traffic accident, on December 3, 1966 at the age of 59.

Authors: *Tomić, Dragić; Mihailović, Ljubodrag*



Jovan M. ŽUJOVIĆ
(1856–1936)

Jovan Žujović belongs to a very small circle of Serbia's intellectual pioneers whose erudition, intelligence, high moral standards and generous efforts marked Serbian science, culture and political life in the closing decades of the 19th century and early decades of the 20th century, a highly dramatic period in which a little Serbia was emancipating from the centuries of backwardness. Žujović was a world renowned scientist, for many years secretary and president of the Serbian Royal Academy, a leading professor of Belgrade College and later Belgrade University, senator, state counsellor, national deputy and, on two occasions, minister in the governments of the Kingdom of Serbia.

Jovan Žujović devoted most of his life to a working on a wide range of projects. As well as teaching at University, he engaged in the workings of the Serbian Royal Academy and in politics. He brought the same élan and meticulous attention to everything he did, even to subsidiary activities such as the popularization of science, mountaineering, or the study of agriculture and rural family collectives. Žujović loathed improvisation and never left anything to chance. This attitude toward work and his humanistic, patriotic, pacifistic and moral qualities coloured everything he did, even the things he rejected doing at any price. Once he picked a task, he was completely engrossed in it, because he strongly believed that the meaning of life was found only in a free creative work.

Žujović founded the Serbian School of Geology, set up the Geology Department of Belgrade College, was the pillar of the Serbian Geological Society, initiated and edited *the Geology Annals of the Balkan Peninsula*, drew a geological map of the Kingdom of Serbia, and wrote a two-volume monograph about the country's geology; he also inaugurated the study of anthropology in Serbia, participated in the founding of scientific archaeology, and was for many years secretary and president of the Academy of Sciences, to name just a few of his engagements and achievements. He supported left-wing ideas and his decades' long political career and the credo could be summed up in the sentence: *Serbia is dearer to us than anything or anybody else*. After World War I, he attuned the statement to the changed circumstances: *Yugoslavia is dearer to us than anything or anybody else*. This served as the motto of the Yugoslav Republican Party. Žujović applied his extensive scientific and cultural erudition, organizational skills, and great patriotism onto everything he did.

Of all Žujović's personal attributes, the most striking was his strict adherence to high moral principles which prompted him to offer his services to science, to fight for freedom and justice, and to defend his fatherland, the man and the mankind. His long-time political associate, J. Prodanović, said this about Žujović: *He was one of the greatest men of character in our country, unwavering in his convictions, and firm in the face of adversity, unbending in his political work. No temptation could deter him from the correct path*.

Žujović sincerely believed in science, in people, and the future.

During his long life he often experienced joy, but also great suffering and disappointments. He became a university professor and a member of the Academy of Sciences early in his life. However, after only a few years of a happy marriage he lost his dear wife and also suffered the humiliation of being expelled from the country. He helped set up the new Independent Radical Party and became its ideologist and a national

deputy, but never became head of this party, and in the end experienced bitter disagreements with other party members. He witnessed Serbia's great tragedy during World War I, but also its resurrection and the creation of Yugoslavia; he saw five of his students become academicians, but he outlived all of them.

Jovan Žujović, the academician, university professor, statesman, public servant, educator, and above all the founder of the school of geology, was one of the fifty most influential men in the history of the Serbian nation.

Author: *Grubić, Aleksandar*

APPENDIX A

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