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One century of the Pharmacological Institute at the Faculty of Medicine in Belgrade – Arnold Holste, Radivoje Pavlović, and Ilija Dimitrijević

Jedan vek Farmakološkog instituta Medicinskog fakulteta u Beogradu – Arnold Holste, Radivoje Pavlović i Ilija Dimitrijević

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Introduction

The earliest written document on medicine in Serbia is found in the Hilandar Typikon, created through the translation and adaptation of the typikon from the Greek Monastery of the Virgin Evergetide in Constantinople, likely in 1199. These ecclesiastical-legal writings were prepared by Saint Sava. Another important document is the Studenica Typikon, created in a similar manner—probably in 1207—based on the Hilandar Typikon. Chapter 40 of both typikons addresses the organization of hospitals in the Hilandar and Studenica monasteries. For this reason, Saint Sava is considered, among other things, the founder of medicine and legislation among Serbs [1].

The most studied document in the field of pharmacology is the Hilandar Medical Codex, written in the vernacular language using Cyrillic script. The creation of the first manuscript is believed to date back to the late 14th century based on the writings of Western European medical schools and Byzantine, Arab, and African medicine. A significant decline in medical practice occurred during the period of Ottoman rule, which lasted approximately 4 to 4.5 centuries [2].

In modern Serbia, pharmacology as a scientific discipline was founded after the establishment of the Faculty of Medicine in Belgrade in 1920, which was significantly delayed by World War I. The Pharmacological Institute began its work in 1924, under the leadership of its founder, Professor Arnold Holste, who also served as its director. Professor Holste studied experimental pharmacology and toxicology in prominent scientific centers across Europe and beyond. He was also a professor of pharmacology and toxicology at the University of Jena in Germany [3].

Collaborators on the stabilization and improvement of the Institute were doctors who studied in Pest and Geneva, Dr. Radivoje Pavlović, and a little later, Dr. Ilija Dimitrijević. They were our first trained pharmacologists, privileged to work alongside Professor Holste. These three scientists formed a highly motivated core for teaching and research. They wrote textbooks and manuals for medical students in the Serbian language. The first generation of students could study pharmacology [4, 5].

A century after the establishment of the Pharmacological Institute at the Faculty of Medicine in Belgrade, Serbia, conditions were created for pharmacology in Serbia to develop into a serious and independent scientific field.

Professor Arnold Holste

Biography and education

Professor Arnold Holste (Figure 1) [6] was born in Hanover, Germany, to father Ferdinand, a senior civil servant, and mother Dorothea Maria Sophia, a housewife [3]. Some sources state that he was born on April 28, 1865, and others on August 28, and even the years 1863 and 1869 are mentioned. The question of his exact birth date was first initiated by Pro-

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fessor M. Mikuličić from the University of Zagreb in 1932. It has since been reliably established that the correct date of his birth is August 28, 1863. This confusion, to which Professor Holste personally contributed, soon brought him a lot of problems in his professional life [7].

Fig. 1 – Arnold Holste [3].

He completed both elementary and high school in his hometown. He enrolled in medicine in 1882 in Göttingen, continued his studies in Berlin, and later again returned to Göttingen, where he was promoted to doctor on March 8, 1888, with the experimental work "Ligation of the urinary ducts of rabbits", which he finished while working during his studies [3].

Professional and teaching-scientific activities

Professor Holste worked for two years as a physician's assistant at the Medical Polyclinic Epstein in Göttingen, Germany, volunteered for three months at the Regional Midwifery School, and was a practicing physician for six years in the Construction Office in Hanover, Germany. In the attachment for his habilitation, Professor Holste wrote: "Having gotten to know the work of medical institutes on numerous trips abroad in Europe and North America, I returned to Göttingen, where I spent four years with Professor Max Vervorn, with the main intention of studying new methods in physiology, so that I could devote myself to experimental pharmacology". After that, he worked in the pharmaceutical industry for four years. This was followed by two years (1911–1913) of experimental work at the Pharmacological Institute of the University of Strasbourg in Strasbourg (then Germany, today Strasbourg, France), as a volunteer with Professor Oswald Schmiedeberg (1838–1921). Schmiedeberg came in 1872 from Dorpat (now Estonia, at that time Russia), where he studied pharmacology with Professor Rudolf Buchheim (1820–1879), who first began to conduct experimental research in pharmacology [8].

In 1913, on the recommendation of Professor *Schmiedeberg*, Professor Holste became an honorary assistant at the Institute of Pharmacology of the Faculty of Medicine of the University of Jena, Germany, under the directorship of Professor Heinrich Kionka. There, he continued to engage in scientific work, but now completely independently. After his habilitation thesis "On peony alkaloid" (1915), he was elected to the position of private assistant professor with the introductory lecture "Physiology of the heart". Four years later, he was promoted to the title of associate professor at the suggestion of Professor Kionka. During World War I, Professor Holste managed the Pharmacological Institute independently, since Professor Kionka was mobilized [3].

Professor Arnold Holste ended his academic career in Germany in May 1924, following his appointment as a full-time contractual professor of pharmacology at the Faculty of Medicine in Belgrade. This appointment was made by decree of King Aleksandar Karađorđević on December 28, 1923, upon the recommendation of the Minister of Education. The contract lasted three years, with the commitment of Professor Holste to extend it for at least another two years. To end his safe and well-paid job in Jena, Professor Holste stated several reasons, some of which were: "to start teaching experimental pharmacology and toxicology", "to acquire the right to a pension by receiving Yugoslav citizenship", and "to take care of his old age". Future events cruelly denied his understanding of the terms offered [7].

The main task of Professor Holste was the founding of the Pharmacological Institute (not the Institute of Pharmacology), which he headed for eight years, from its foundation in 1924 to 1933. His wife, Irmgard Seifert (born in 1891, married Holste, somewhere written as Holete), was the first laboratory technician. She worked until 1933, when the contract of Professor Holste as a regular professor expired [3].

The establishment of the Pharmacological Institute included the following: 1) physical organization of the Institute – organizing classrooms for conducting theoretical classes, organizing laboratories for practical teaching and scientific research, organizing the library; 2) formation of teaching staff; 3) writing textbooks and manuals for students; 4) participation in expert bodies in the field of pharmacology and toxicology; 5) participation in national and international scientific and professional meetings [9].

Professor Holste taught in the Serbian language, which he learned within three years, and used the Serbian Cyrillic script. With the assistance of Milija Magarašević, a future physician, he authored the textbook *Experimental Pharmacology* (1929) [10]. In it, he stated: "Empirical pharmacotherapy was achieved through patient observation, which is, of course, unreliable. It becomes valid only when such experience receives experimental confirmation".

Professor Holste is the first toxicologist in modern Serbia and is recognized as the founder of toxicology as a scientific discipline in our country. In his textbook *Basics of Toxicology* (1930), he explained why toxicology should be studied as a separate field [11]: "The need for independent toxicology teaching grew more and more, as the doctor was required to make an early diagnosis of poisoning and take over their treatment". Toxicology is not only intended for medical professionals, but also holds importance for other professions.

Together with collaborators Dr. Radivoje Pavlović and Dr. Ilija Dimitrijević, Professor Holste contributed to the

writing of the *Lexicon: Doctor in the House*, edited by Aleksandar Kostić, a book that had ambitions to become a "true folk medical encyclopedia". They wrote in the field of pharmacology and pharmacognosy, totaling 186 references [12].

"Professor Holste was very popular among students, not only for his instructive lectures but also for his helpfulness, tact, and love for students". He published more than 50 articles. Most of them were published in German, French, and Italian, with the majority published prior to his arrival in Belgrade [6].

Professor Holste published more than 20 articles in Serbian, thus contributing to domestic journals and popular pharmacological and toxicological texts in newspapers. He also delivered a great number of free lectures in courses for graduate medical students from all over the country. Such a great contribution to Serbian science shows the great support and loyalty of Professor Holste to the country he chose to live and work in. Professor Holste passed on valuable research methods and techniques, already proven in his own scientific work, to his collaborators Dr. Radivoje Pavlović and Dr. Ilija Dimitrijević [6].

More than others, Professor Holste dealt with the following areas: cardiovascular pharmacology and pharmacology of cardiotonic glycosides on the experimental model of isolated frog heart, physiology and pharmacology of the uterus, diuretics, and biochemical isolation of active principles from plants. "As an experimenter, he was very meticulous; he only liked clean and precise work, which is why he gave his own modification of the experimental technique in some of his studies" [6].

Professor Holste is involved in the work of many organizations that were responsible for the advancement of the pharmacology profession and various legal regulations in the medical field. He was a member of several important institutions and scientific societies. Among them were: the Main Health Council at the Ministry of Social Policy and Public Health of the Kingdom of Serbs, Croats, and Slovenes, which is the highest expert advisory body of the Ministry of Health; the Permanent Expert Council for Drug Testing, established in 1926, whose work aims to evaluate drugs submitted by the Ministry of Health; the Commission for the Control of Drugs of Biological Origin; the Commission for the Development of the State Pharmacopoeia; the Directorate for the Protection of Industrial Property at the Ministry of Trade and Industry. He also served as the Delegate of the Kingdom of Serbs, Croats, and Slovenes at the International Conference for the Unification of Maximum Doses of Heroic Medicines. Additionally, he was a member of several scientific societies, including the German Pharmacological Society, the Society of German Naturalists and Doctors, the German Society for Internal Medicine, and the Biological Society in Belgrade [6].

Due to legal and administrative regulations that required university professors to retire at the age of 70, Professor Holste resigned from his position as director of the Institute in 1933 upon reaching that age. However, he never officially retired, neither in 1933 nor, according to the University of Jena, in 1934. Due to his poor financial situation, he had to continue working as a part-time professor, though with a steadily decreasing income. His final contract extension was granted on March 16, 1935, and it expired on April 5, 1938. Death, unfortunately, was faster. Professor Holste passed away in Belgrade on April 12, 1937, at the age of 74 [3].

Professor Holste was buried at the New Cemetery in Belgrade on April 14 by his wife, Irmgard (not "Nirgord", as mistakenly recorded in some documents). He was buried under the name "Holete", according to certain official records. The grave was excavated between 2002 and 2004, and the current location of his remains is unknown, as well as the whereabouts of his tombstone, although a photograph of the tombstone exists in the cemetery archive. His complete legacy, described as "laboratory and office items and books", was donated to the University of Belgrade by Irmgard Seifert, who later returned to Germany [3]. As Dr. Radivoje Pavlović wrote: "The entire staff of the Pharmacological Institute in Belgrade will always remember him with gratitude for all the good, beautiful, and useful things that the founder and first director of the Pharmacological Institute gave them during his lifetime, both in word and deed". He added: "...the activity of Professor Holste was very abundant and varied. In addition to his professional achievements, he was very interested in archaeology, ancient history, and classical languages; he traveled a lot and knew not only the whole of Central and Western Europe but also visited America and Africa. Personal contact and the conversation with him were always very interesting" [6].

Professor Radivoje A. Pavlović

Biography and education

Professor Radivoje Pavlović was born on October 5, 1893, in the town of Szigetcsép (Serbian name *Čip*) on Csepel Island (former Austro-Hungary), about 50 km south of Budapest, to father Alexander, an Orthodox priest, and mother Zorka (born Petrović), a housewife. In secondary publications, mistakes are made about his place of birth [4].

Dr. Pavlović finished elementary school in Serbian Kovin, 15 km south of *Čip*, where his father was a parish priest (before that, he served in *Čip*). After his father's death at the age of 34, his mother moved to Novi Sad with him and his sister Melania, who later graduated from high school for girls. There, he attended the Serbian Orthodox High School, one of the best and most influential Serbian high schools at the time, as a scholarship holder of the "Athanaseum" endowment. He graduated in 1912. There he acquired a broad general culture, knowledge of classical languages, classical and modern literature, fine arts, and he developed his musical talent under the influence of music professor Isidor Bajić [13].

Dr. Pavlović studied medicine in Budapest as a student of the Tekelijanum institution, an endowment founded in 1838 by doctor of law Sava Popović Tekelija. He entered the faculty in 1912 and was promoted to doctor of medicine on May 25, 1918 (Figure 2) [13].

Fig. 2 – Radivoje Pavlović (taken with permission from the Pavlović family archives).

Dr. Pavlović's colleagues said he "completely lost his sight very early, almost at the beginning of his university career. Although the blow was ferocious, everyone who knew Dr. Pavlović knows very well that he endured it with admirable courage and that he did not give in for a moment" (Simo Milošević) [13]. He had a wife, Stanija (born in 1901 in Đurđevo, Kragujevac, Serbia, died in 1988 in Belgrade), a pediatrician at the Institute for the Protection of Mothers and Children. They had two daughters: Miroslava (Pavlović-Hournac), a biologist and world-renowned scientist, and Zorka (Zorica Stević), a primary care physician, who died in Belgrade in 1990. Zorica is survived by her son, Đorđe, and daughter, Jasna, who both live and work with their families in Belgrade [4].

Professor Radivoje Pavlović died suddenly on August 20, 1938, in Zlatibor, Serbia. He was buried at the New Cemetery in Belgrade [13].

Professional and teaching-scientific activities

He first worked as a corps doctor with the Danube Howitzer Division, stationed in Petrovaradin and Subotica, Serbia, holding the rank of reserve medical captain, second class. After this, he worked as a specialist in internal and nervous diseases in Novi Sad, Serbia, serving as an assistant physician at the state City Hospital and in the children's home and hospital "Institute Marije Trandafil for Serbian Orthodox Orphans", commonly known as Trandafil's Orphanage. There were a lot of war orphans after World War I. For three months, he worked in the recruitment commission of the District Command in Veliki Bečkerek, Serbia. Later, he worked in Belgrade as a specialist in internal medicine until April 1930. He went to Berlin (1920–1922), where he studied biochemistry under Professor Peter Rona, a physician and biochemist. He specialized in internal medicine under Professor Alfred Goldscheider, internist, military doctor, and neurologist with great clinical achievements. Dr. Pavlović stated: "As a role model of a doctor, I always had the late Professor Jendrassik (Pest), and as a scientist, Mr. Professor Rona" [14].

In 1922, he became an honorary assistant at the First Internal Medicine Clinic in Belgrade, where the director was Professor Aleksandar Josifovich Ignjatovski, a Russian emigrant, the first professor of internal medicine. In October 1924, Dr. Pavlović was assigned to Professor Arnold Holste as a translator from German to Serbian. At the beginning of 1926, he was transferred to the Institute of Pharmacology as an assistant. Dr. Pavlović was the first pharmacology assistant in modern Serbia. In March 1927, he was elected to the position of assistant professor and held a very notable introductory lecture, "Subjectivity in therapy", where he presented his understanding of the thinking side of the doctor in his therapeutic activity [14]. He was re-elected to the same title in 1930 and was promoted to associate professor in 1933. After the resignation of Professor Holste in 1933 and at his suggestion, he became the director of the Institute until the end of his life [4].

Professor Ilija Dimitrijević wrote: "As a teacher, he was one of the most popular among students; his lectures were at an enviable level both in terms of conscientiousness of processing and clarity of presentation, and they always corresponded to modern understandings. His speech was suggestive and was always listened to with the greatest attention". The harmonious atmosphere within the institute, initially established by Professor Holste, was maintained by his associates. "He was a very responsible man. When he accepted a new person into his institute, from that moment on, he took responsibility for their future." A good example for any time [13].

In 1928, Dr. Pavlović wrote the textbook *Recipe book* (in Serbian *Receptura*), the first of its kind in our country. The second edition was revised and supplemented in 1933. The *Recipe book* covers a wide range of medications, primarily magistral preparations, custom-made drugs important for clinical practice. It discusses their dosage forms, methods of prescription, and the components of a proper prescription. The book begins with Rp., an abbreviation of the Latin word "recipe", which means "to take", presented without any graphic additions. Such precision is not always present in today's professional literature and clinical practice [15].

The first textbook for the study of drugs, called *Materia medica with pharmacodynamic data and recipes*, was written by Dr. Radivoje Pavlović and Dr. Ilija Dimitrijević at the initiative of Professor Holste, published in 1929 [16]. In the preface, the authors state: "...the book should help students understand theoretical lectures in pharmacology and clinical subjects, demonstrations of drugs and medicines, and practical exercises from recipes. It should make it easier for doctors to navigate medications and prescribe medications in daily practice." At the end of the book are 172 recipes as well as a very well-made and organized glossary (register).

Dr. Simo Milošević wrote: "Radivoje Pavlović had another characteristic of a true scientist and head of a scientific institution: scientific selflessness. For him, it was not important whether he signed the work, only that it was done. And finally, he constantly worried about those who have to

take over the job after him, for the heirs, which is a rare case in our environment" [13].

He published a large number of papers in international journals, which shows the quality of the presented results and knowledge of foreign languages. He spoke Hungarian, German, French, and English, then Latin and Greek from the classical languages, and used Russian and Italian. About his publications, Dr. Ilija Dimitrijević wrote: "They bore the imprint of his personality as a scientist, showed comprehensive knowledge of the subject, testified to the clear presentation of scientific problems, the precision of the tests performed, the critical judgment of the results, and the caution in drawing conclusions" [13].

In addition to 25–26 published works in which he was mostly the sole author, and occasionally one of the two co-authors, a large number of publications were created under his leadership.

One of Professor Pavlović's works refers to medical terminology, whose topicality has not yet been surpassed. Discussions on this subject began as early as 1842 in the Society of Serbian Literature, and continued in the Serbian Medical Society shortly after its founding in 1872. Unfortunately, despite the very clear guidelines given by Professor Pavlović, this area has still not been worked on nor been organized. He believes that "medical terminology in any language will never and can never be fully elaborated, settled, or definitive in all details, as long as the language itself is alive. But in the main issues, certain directives must be established, there must be some support". There are two possibilities for creating medical terminology. One is finding a Serbian equivalent for each foreign medical term, in which there are folkloristic and neologistic approaches, and the other is the transcription of foreign medical terms directly into the language [17].

He believes that mistakes occur because "semi-literate intellectuals, so numerous in their professions, do not study their language enough during their schooling, and become resistant to the influence of grammar, syntax, and stylistics of foreign languages, especially if they are still engaged in those environments for a long time" [17].

Medical Review journal

Professor Pavlović was one of the founders, editor-in-chief, and the owner of the journal called *Medical Review* (*Medicinski pregled* in Serbian). It served as a joint publication for Serbian, Bulgarian, Croatian, and Slovenian doctors and was published in each of these respective languages. The editorial board included representatives from the medical faculties in Belgrade, Zagreb, Ljubljana, and Sofia. Over the course of its 14.5-year run, the journal published 178 issues in 170 volumes. Thanks to the dedication of his wife, publication continued for approximately two and a half years after Professor Pavlović's death. The November 1938 issue of *Medical Review* was entirely dedicated to the life and work of Professor Pavlović, whom we often mention in this text [13].

Extracurricular activities

Professor Pavlović had numerous professional obligations outside the faculty. He was, for instance, a member of the Permanent Expert Council for Drug Testing, the Biological Society in Belgrade, the Serbian Medical Society, and the German Pharmacological Society [13].

Dr. Simo Milošević said: "He was a Greek by the fineness of his spirit, a Roman by the height of his morals, a Slav by the kindness, breadth, and warmth of his soul" [13].

Professor Ilija N. Dimitrijević

Biography and education

Professor Ilija N. Dimitrijević was born on March 29, 1896, in Belgrade, to father Nikola, a café owner and rentier, and mother Donka, a housewife. He had three sisters – Zorka, Pava (died at childbirth), and Frosina. Frosina's two daughters, Miroslava and Dragoslava, along with Dragoslava's son and daughter, are his surviving descendants. Although of Cincar origin (his grandfather Zaharija came from Kruševo, present-day North Macedonia), Professor Ilija Dimitrijević identified as a Serb and celebrated the family patron saint, Saint Nicholas. During World War I, Professor Dimitrijević, his parents, and his three sisters lived in Geneva, Switzerland. He was married to Zora (born in Pirot, Serbia, in 1897, died in Belgrade in 1976), the daughter of Pera Aranđelović, a pharmacist from Niš, Serbia, and Mara, a housewife. They had no children. Following World War II, Professor Dimitrijević lost his family house at Studentski trg 4 in Belgrade and was given an apartment in exchange [5].

Dr. Ilija Dimitrijević completed elementary school and attended high school in Belgrade until the seventh grade, when his education was interrupted by World War I. He finished the eighth grade in 1916 at the Serbian high school in Nice, France. That same year, he began studying medicine in Geneva, where he obtained the title doctor of medicine in 1921 (Figure 3) [18].

He died on January 1, 1968, and was buried at the New Cemetery in Belgrade [5].

Fig. 3 – Ilija Dimitrijević (taken with permission from the Dimitrijevć family archives).

Professional and teaching-scientific activities

After graduating, Dr. Dimitrijević completed a one-year military service in Belgrade and held the rank of reserve medical captain, first class. In 1923, he began working as a volunteer at the First Internal Medicine Clinic, and in 1924, he became an assistant. He specialized in internal medicine in Belgrade and received the general license to practice private medicine in 1923 and the local license in 1924. The first time he practiced medicine was until 1930, and the second was during World War II (the first time he retired), from the summer of 1943 to 1945. Dr. Dimitrijević spent a year (1925–1926) in Paris, France, and Berlin, Germany, where he studied and completed his specialization in biochemistry. In Paris, he worked in the laboratory of Professor Chauffard at the Internal Clinic, and in Berlin, in the laboratory of Professor Pincussen. Upon returning to Paris, he completed a course in microbiology at the Pasteur Institute. The academic paths of Dr. Pavlović and Dr. Dimitrijević are very closely connected. In fact, the promotion of Dr. Pavlović to a higher position within the Institute allowed Dr. Dimitrijević to apply for the vacant position. In March 1927, he was transferred from the Internal Medicine Clinic to the Institute as an assistant professor following Dr. Pavlović's advancement. He was appointed assistant professor in 1931, after which he began teaching both practical and theoretical classes, alongside Professor Holste and Professor Pavlović [5].

After the death of Professor Pavlović, Professor Dimitrijević was appointed director of the Pharmacological Institute in September 1938. He held this position until 1953 (except during World War II when he did not work at the Faculty), after which he was "removed" from the Faculty. This position cannot be denied, as can be seen in recent secondary publications [5].

He became an associate professor in 1939 and a full professor in 1950. At the same time, he was a member of the Council of the Faculty of Medicine. In November 1948, the Council appointed him the head of the Department of Therapy (pharmacology, balneology, and physical therapy) and elected him to be a member of the Forensic Medicine Board. His work at the Faculty of Medicine stopped for the first time due to his retirement on April 3, 1943, during the Nazi occupation. He was succeeded by Dr. Vojislav Ristić, a pharmacology teacher at the Faculty of Veterinary Medicine in Belgrade [19].

As a professor and scientific researcher, Dr. Ilija Dimitrijević is perhaps most accurately described by the so-called "Characteristics", formulated shortly after World War II. They included biography, expertise, political and ideological commitment. In those "Characteristics" from 1949 and 1950, it is written: "A very good expert knows his subject well and follows science. He conducted scientific work and published scientific papers. A good organizer, conscientious and meticulous in his work. He does all professional work entrusted to him diligently and conscientiously. A very good lecturer and makes sure to give students as much practical knowledge as possible. He is fair to the students. According to colleagues, tactful. He is working on a textbook". It has been added: "as a lecturer, one of the best at the university...his lectures are always attended... he has a very good attitude towards the students during the exam...very well-read...a man of quite a wide culture and education", but is "comfy by nature...a weak experimenter" [20].

As a teacher and pedagogue, Professor Dimitrijević is fondly remembered by his post-war students. One student recalled: "It was a pleasure to study with Professor Ika Dimitrijević, as we students called him. He respected every candidate and listened carefully to their answers. Through the exam questions, he patiently, skilfully, and benevolently guided students through the entire material. With a noble appearance, always impeccably dressed, he gave lectures in a packed amphitheater, where students immediately absorbed every word he said" [5].

Together with Professor Radivoje Pavlović, Professor Ilija Dimitrijević wrote a textbook on pharmacology titled *Materia medica: with pharmacodynamic data and recipes* [16]. In 1949, another textbook, *Pharmacology*, was published based on the lectures of Professor Ilija Dimitrijević [21]. There are 12 chapters in the book based on the effects/mechanisms of drug action and on the organ systems they act on.

By the time Dr. Dimitrijević was elected full professor, he had published 31 papers. Some of them, based on their focus and approach, would be classified within the domain of today's clinical pharmacology. His knowledge of foreign languages (French and German, including English, Russian, and Italian) enabled him to present his scientific results both to the domestic and European scientific public [5].

Professor Dimitrijević is the sole author of most of his published works. From 1932 to 1934, he worked at the Physiological Institute of the Faculty of Philosophy in Belgrade with Professor Ivan Đaja. Together, they published several papers on thermoregulation and thermogenesis under experimental conditions. The Biological Society in Belgrade was established as a branch of the Biological Society in Paris. The Society had its own journal, *Comptes rendus des séances de la Société de biologie et de ses filiales*, which published the oral presentations of its members. Among the contributors were Professor Pavlović and Professor Dimitrijević [22].

In both his scientific work and his teaching, Professor Dimitrijević, like Professor Pavlović, adhered to the principles of Professor Holste, mentioned in the preface of the textbook *Materia medica*: "Today we must strictly distinguish the description of drugs (*Materia medica*) from experimental pharmacology, which in recent years has again found its way to practical medicine...The triad *Materia medica*, experimental pharmacology, and pharmacotherapy, together constitutes modern drug science as a whole. These three modern disciplines developed from each other in the order mentioned and are constantly in the closest possible relationship" [16].

Among Professor Dimitrijević's most significant contributions outside the Pharmacological Institute was teaching pharmacology at other faculties. This began in 1939 with the establishment of the Pharmacy Department within the Faculty of Medicine. That same year, by the decision of the Faculty Council, he was appointed part-time professor of pharma-

cology and became a member of the first Council of this Department. In the fall of 1948, he also became involved with the Faculty of Dentistry in Belgrade, an integral part of the Great School of Medicine. He was appointed part-time associate professor of pharmacology. He created a teaching program, announced a vacancy for an assistant, hired demonstrators, and started lectures. Some secondary sources have claimed that Professor Dimitrijević was the first pharmacology teacher at the Faculty of Veterinary Medicine in Belgrade. However, as suggested by some sources, Dr. Vojislav Ristić was actually in this position, who succeeded the briefly appointed part-time assistant Siniša Bogdanović [5].

Professor Dimitrijević was a member of many professional bodies throughout his career. From 1938, he served on the Permanent Expert Council for drug testing, first as a member and later as its president. He was an extraordinary member of the Main Sanitary Council and a member of several commissions, including the Commission for Medicines of Biological Origin and the Commission for the Preparation of the Pharmacopoeia, serving first as a member and then as chairman of the Opium Commission at the Ministry of Trade and Industry. He was also a member of the Directorate for the Protection of Industrial Property at the Ministry of Trade and Industry, the Financial and Construction Committee for the Building Project of the Faculty of Medicine in October 1939, the Forensic Medical Committee, and the Commission for the Selection of Land for the Construction of the Pharmacological Institute. In addition, he was a member of the Editorial Board of two prominent medical journals – the *Serbian Archive for All Medicine* and *Medical Review* [5].

During World War II, immediately following the bombing of Belgrade in 1941, at the onset of the short-lived April war against fascist Germany, Professor Dimitrijević along with Associate Professor Siniša Bogdanović and approximately thirty other university professors, was arrested and detained at the Banjica concentration camp, where Professor Dimitrijević was held for three weeks [5].

In the early 1950s, Professor Dimitrijević was "removed" from the Faculty, despite never having been involved in politics. The term "removed" was used instead of "dismissed/transferred to another workplace" and was typically applied only after the academic and administrative staff had been restructured to align with the needs of the new state. Files of teachers and associates, in which "Characteristics" had a special place, were created based on attitudes, opinions, findings of the party representatives, faculty committees, and state authorities [20].

In "Characteristics" from 1949, it is stated: "According to the testimony of his assistant (Atanacković), he shows a tendency to fail advanced students in the exam" [20]. However, this claim was later denied. Dr. Dimitrije Atanacković had been an assistant at the Pharmacological Institute since 1940. In 1947, the Faculty of Medicine was founded in Skopje, where he served as the director and assistant professor at the Pharmacological Institute [23].

The action taken against Professor Dimitrijević was supported by both the professional and student press. In August 1953, Miroje Perović [24], a medical student and organizational secretary of the Communist League Committee of the Faculty of Medicine, wrote: "...he does not provide help or support to his colleagues" and "he has been promising a textbook on pharmacology for years, but to this day nothing has come of it". These statements ignored the fact that Professor Dimitrijević's pharmacology textbook had already been published by the state institution, Science Book [21]. Among the employees at the Institute, the only teacher was Professor Siniša Bogdanović, who held the position of part-time professor in 1949 and became a full-time professor. In 1953, assistants were among others, Dr. Milenko Milošević, Dr. Mulenko Medaković, and Dr. Vladislav Varagić [23].

According to the decision of the Council of the Faculty of Medicine, adopted by the Council for Education and Culture of the Republic of Serbia on October 21, 1953, Professor ime Ilija Dimitrijević was "immediately dismissed from all duties and functions at the Medical High School" [25], which included the Faculty of Medicine, Pharmacy, and Dentistry.

On the initiative of the Serbian Medical Association from 1993, the Teaching and Scientific Council of the Faculty of Medicine in Belgrade, in 2001, annulled all legal acts of the Faculty of Medicine related to the "removal" of 24 teachers and associates. Professor Dimitrijević himself never requested this during his lifetime [26].

After being "removed" from Medical High School, Professor Dimitrijević was briefly employed at the Council for Public Health and Social Policy of the Republic of Serbia. In March 1954, he was transferred to the Institute for Testing and Control of Medicines of the Republic of Serbia in Belgrade. He worked there until his final retirement in 1964 [5].

Conclusion

The Pharmacological Institute was founded in 1924 by Professor Arnold Holste, a professor of pharmacology and toxicology at the University of Jena, Germany, who was also its first director. Professor Radivoje Pavlović and Professor Ilija Dimitrijević, Serbia's first trained pharmacologists and toxicologists, were the first associates of Professor Holste. All three possessed exceptional medical education, fluency in foreign languages, and broad general knowledge. Together, they represented an excellent and powerful nucleus for the foundation, development, and advancement of pharmacology and toxicology in modern Serbia.

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