

## IN MEMORIAM

ACADEMICIAN SINIŠA STANKOVIĆ (1892-1974), FOUNDER OF MODERN ECOLOGY IN SERBIA

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It was exactly forty years ago (February 24, 1974) that the life of one of the most eminent representatives of Serbian science, a world-class biologist, gifted teacher, exceptional cultural, social and political figure and university professor, Siniša Stanković, ended. He left the "frame of life" that he so passionately studied throughout his entire career – our leading biologist and ecologist, who dedicated his entire arduous, but nevertheless rich and fruitful scientific and academic work to the studies of complex relations between people and their surroundings. A dedicated thinker, accomplished teacher to numerous generations of biologists and ecologists and his nation's great son, left our midst.



Academician Siniša Stanković

Siniša Stanković was born in 1892 in Zaječar. He attended elementary school in Negotin and grammar school in Negotin and Belgrade. In 1910, he began studying natural sciences (zoology with botany) at the University of Belgrade, where he graduated in 1914. He spent his student days actively attending his classes, while at night, as a talented flute musician, he performed to support himself and his family. Stanković quit his studies when the First World

War broke out and despite his already ailing lungs, he volunteered and went to war, actively participating in the Mount Babuna battles as a member of the famous Iron Regiment. Together with the Serbian Army and civilian population, he retreated south via western Macedonia, Lake Ohrid and Thessaloniki to Corfu. Along with a group of Serbian students and pupils, he was sent from Corfu to France. By order of the Serbian Embassy in Paris, he was appointed Head of a group of Serbian pupils, and for a while taught botany to grammar school pupils. He finished his biology studies in Grenoble in 1918, where he also defended his doctoral thesis in 1921. That same year he returned to the

University of Belgrade, where he was appointed Assistant at the Faculty of Philosophy's Zoological Institute. Having in due course earned all his academic titles, he achieved tenure as a professor in 1934. That same year he was elected a corresponding member of the Serbian Royal Academy. In addition to the Philosophy Faculty, he also lectured on fishery at the University's Faculty of Agriculture and Forestry and on the biology and pathology of fish, crabs and shellfish at the Faculty of Veterinary Medicine.

The developmental path of biologist and scientist Siniša Stanković was inseparably linked to the development of contemporary scientific thinking about biology in Serbia and the former Yugoslavia. Some eighty years ago, in 1933, and a step ahead of his time with his popular science monograph *Frame of Life* (principles of ecology), he practically established the foundations of the then, relatively new and little known science of ecology, i.e. the science of interaction between organisms and their environment. There he predicted its turbulent development and essential significance, at the same time setting up the solid foundations for the development of other biological disciplines – hydrobiology, limnology, comparative and evolutionary morphology and theoretical biology, for which the biological sciences, not only of the former Yugoslavia, but the wider region, are lastingly indebted to him.

This forward-thinking university professor, patriot and antifascist, democrat and humanist, through the theoretical aspects initially put forward in the *Frame of Life* and further developed in his 1939 book, *Living Space*, strongly opposed the Nazi-Germans' understanding of the term "racism" and their proclaimed exclusive right to a living space. Although he continued in his duties as professor and director of the Faculty of Philosophy's Zoology Institute at the very beginning of World War Two and the German occupation, as well as being appointed by the University Senate to run the Institute for Botany and the University's Botanical Garden, he was forced to interrupt his work due to arrests and temporary suspension, until finally, the University authorities sent him to early retirement in 1942, relieving him of all of his University ties in 1943. In November 1941, he was arrested along with a number of prominent cultural and public figures by the occupying authorities and interned in the Banjica concentration camp. He was released on the eve of 1942, most likely due to the brave intervention in Berlin of his colleague and long-time friend, the renowned German hydrobiologist August Thienemann. However, in November 1943, a police raid uncovered his illegal engagement in the National Liberation Movement. He had already become a member of the Serbian

branch of the Movement's Supreme Command. He was arrested again and sent to the infamous prison in Đušina Street and from there to the Banjica concentration camp in March 1944. Before the liberation of Belgrade in 1944, despite having been sentenced to death, and in permanently undermined health, he managed to escape the camp and to live illegally in Belgrade. During the battle for Belgrade, he was associated with the National Liberation Movement's Serbian Supreme Command and was involved in the preparations of the Anti-Fascist Assembly for the National Liberation of Serbia.

A year later, on November 29, 1945, he was given the historical role of officially announcing, from the floor of the Constitutional Council of the Democratic Federal Yugoslavia, and in accordance with the adopted Declaration, the abolition of the monarchy and the establishment of the Federal People's Republic of Yugoslavia. Following the liberation of the country, Professor Stanković took on a number of important state and social functions. He was elected the first Chairman of the National Liberation Front of Belgrade, first speaker of the Anti-Fascist Assembly for the National Liberation of Serbia and then first President of the Presidency of People's Assembly of Serbia (1944-1953). He was a member of both the Federal and Republic Parliaments for several terms. From 1950, he was the first president of the Yugoslav National Commission for UNESCO. He represented Yugoslavia at many international meetings, and was a member of the Yugoslav delegation during the 1946 Paris Peace Conference. The Serbian Academy of Sciences and Arts elected him as a permanent member on March 2, 1946. From 1948 to 1959, he was Chairman of the Council of Academies of the Federal People's Republic of Yugoslavia, where he significantly contributed to the organization of scientific research in Yugoslavia; in this capacity, he represented Yugoslav science around the world. In 1954, he was one of the cosignatories of the Novi Sad Agreement of leading Yugoslav writers and linguistic experts that created a unified terminology that led to the publication of the Orthography of the Serbo-Croatian Language in Novi Sad and Zagreb in 1960 by both *Matica srpska* and *Matica hrvatska*. From 1963 to 1966, he was



S. Stanković with his associates on Kopački Rit, Croatia, in 1968

a member of the Presidency of the Serbian Academy of Sciences and Arts. During that time, he was the Vice President of the Council of Academies of the Socialist Federal Republic of Yugoslavia, at the same time coordinating the work and activities of all the Yugoslav academies of sciences.

Immediately following the liberation of the country, Professor Stanković was engaged in rebuilding the demolished city of Belgrade and in establishing and organizing scientific and higher education institutions. Together with his associates, he worked to rebuild and re-establish the courses and scientific work at the Zoological Institute of the Faculty of Philosophy, which had been devastated and set ablaze

by German troops withdrawing from Belgrade (since 1947 it has served as the Faculty of Sciences and Mathematics). He lectured regularly here until October 1962. For a while, apart from his engagement at the Faculty of Philosophy, he lectured at the University of Belgrade's School of Medicine and at the Faculty of Veterinary Medicine. At the same time, he gave valuable contributions to the establishing of biology courses and to the organization of scientific research at the newly formed universities in Skopje, Sarajevo, Novi Sad and Priština. In the beginning, at the Faculty of Philosophy he taught almost all of the courses and gave lectures to students in all academic years (General Zoology, Cytology, Comparative Anatomy, Comparative Embryology, Experimen-

tal Developmental Zoology, Heredity Science and Zoogeography). Later, as younger members of staff were appointed, he continued teaching Comparative Anatomy of Vertebrates and Zoogeography with the ecology of animals. In collaboration with Dr Smilja Mučibabić, for his students he initially translated two university textbooks, *Basics of General Zoology* by A. Kühn (from German) and *Course of Darwinism* by A. A. Paramonov (from Russian), as well as other scientific works: *The Origin of Life* by A. I. Oparin, *The Biosphere* by V. I. Vernadsky and *The Origin of Terrestrial Vertebrates* by I. I. Schmalhausen, which became established as obligatory reading. At the same time, he wrote two unique and to this day classic university textbooks: *Comparative Anatomy of Vertebrates* (1950) and *Ecology of Animals* (1962, 1968), the first of their kind in Yugoslavia. In 1961, he wrote a textbook for secondary schools, *Biology – Organizational Types of Plants and Animals*.

Professor Stanković was one of the leading designers of the post-war development of Serbia's biological science. His theoretical works dedicated to contemporary ecology as a synthetic multidisciplinary and systemic science, i.e. the scientific study of the structure and functions of natural systems, which, together with the other natural sciences contribute to the modern understanding of the graded and hierarchical organization of nature as the framework of general ecological theory, distinguish him in the field. He repeatedly emphasized the practical significance of biological research, which he consistently applied in his scientific works. An open-minded man, with special human skills and immense work stamina, and with the intellectual power and charisma of his renaissance personality, Professor Stanković successfully managed to draw together in scientific research teams, in addition to biologists and ecologists, other specialists from various fields and of different profiles.

At the University, he enjoyed the reputation of one of the leading lecturers. His lectures are remembered not only for their scientific content, but also for the beauty of his style and language – students not only learned about biology, but also vocabulary

and linguistics. As an inspired teacher and promoter of science he would fill the amphitheatre of Belgrade's Kolarac University as well as various rostrums and universities throughout the former Yugoslavia. He wrote numerous scientific articles for daily newspapers and science magazines, and was frequently invited to lecture at the most prestigious universities around the world.

As a man of broad education and culture, he spoke a number of languages. He was also musical, singing and playing the flute and piano. As a school-boy he attended the music school Mokranjac, as a student he performed in the well-known Belgrade restaurant Kolarac and with the cinema orchestras that backed the silent movies, and in his old-age he was a member of the Belgrade University's *Collegium musicum*.

Based on the results of his long-term studies on the hydrobiology and limnology of the Balkan lakes (Ohrid, Prespa and Skadar), the starting points of his research were predominantly aspects of the ecosystem and the metabolism of lakes and their production processes. In the 1930s, Stanković, in association with several other authors, brought into question the generally accepted theory of lake types (A. Thienemann and E. Naumann), based on the study of lakes in the northern and temperate zone. This theory had to be revised and supplemented (taking into account lakes from other climatic zones – arid, tropical and wet). Thus, he significantly contributed to the worldwide development of limnology. At the same time, based on his research, Stanković established the theory of the origin, history and development of the fauna and fresh-water life in the Balkans, building on the early geological and geomorphic explorations of the geographer Jovan Cvijić. With these faunistic analyses, he provided a significant contribution to the understanding of the Palearctic ecozone in its entirety, providing a long-lasting contribution to both domestic and worldwide biological science. The crown of his almost forty-year work in research and numerous collaborations with associates from Yugoslavia and abroad, bringing him international recognition, was his capital book, *The Balkan Lake*

*Ohrid and its Living World*, published in English in 1960 by Dr W. Junk, the Hague, Netherlands, as part as the renowned edition *Monographie biologicae*. Previous issues of this work were published in Serbo-Croatian and Macedonian (in 1957 and 1959, respectively). In this unique and complex study of the ecological system of the oldest European lake of pre-glacial origin (end of the Tertiary period), which as a gigantic natural museum contains living fossils in its waters, Stanković made an exhaustive study of the limnological characteristics, origin, age, biogeography, geology, geography, physicochemical conditions of life, and especially lake metabolism and organic production, living communities, the wealth of unique ancient relicts and endemic fauna, as well as its development from the pre-glacial period, while at the same time analyzing the problems related to the commercial importance of the lake for fishing.

Professor Stanković was a multifaceted person, intellectually brilliant, of exceptional general and professional erudition, with the ability to embrace and to understand nature, easily comprehending the essence of complex problems of the living world. Throughout his entire, exceptionally rich and diversely creative opus, from his early works to his masterpiece, *The Balkan Lake Ohrid and its Living World*, his dialectical understanding of life as a unique and indivisible entirety prevails. He was one of the first ecologists to examine natural zones through an ecosystemic and multidisciplinary approach, which is evident in his all-encompassing study of the aquatic system of Lake Ohrid. In the early 1950s, he insisted his associates conduct complex ecosystemic and multidisciplinary research of the terrestrial ecosystems of one of Serbia's highest mountain, Kopaonik, fearing the devastating effects of humans and their actions. Together with his associates from the former Institute for Ecology and Biogeography of the Serbian Academy of Sciences, with this ecosystemic and multidisciplinary approach and teamwork in the realization of research, he set up the unique and contemporary, but conceptually independent so-called Stanković (or Belgrade) School of Ecology, recognized worldwide. In addition, Professor Stanković represented Yugoslavia at the International Association of Theoretical

and Applied Limnology from 1926, almost from its inception, and he was also the Association's long-term vice president from the post-war period until his death. In 1934 he initiated and organized the 7<sup>th</sup> Congress of Limnologists in Belgrade, with the theme *Fishing on Large Lakes*, which was followed by an expert excursion to Lake Ohrid. He was a long-time member of the editorial board of the most famous and oldest journal on limnology in the world, the German *Hydrobiology Archives*. In cooperation with several of his colleagues from Danube countries, and inspired by the results of his earlier explorations of this river (1937, 1938), in 1956 he was one of the founding members of the International Association for Danube Research (IAD) in Vienna, where he was not only the sole Yugoslav representative until almost the end of his life, but also supervisor of the national program, *Explorations of Limnology of the Danube*. During the 15<sup>th</sup> Congress of Limnologists in 1962, Professor Stanković was awarded the prestigious Einar Naumann Medal at Madison University, Wisconsin, USA, for his personal contribution to the development of limnology worldwide, as well as for his knowledge of the unique fauna of Lake Ohrid, presented in his masterpiece, *The Balkan Lake Ohrid and Its Living World*. As part of the International Biology Program founded in 1964 in Paris, he ran the Yugoslav branch of the large international project *Organic Productivity of Water and Terrestrial Ecosystems*. His vast knowledge and experience helped in the realization of the Yugoslav national program, which was a part of the international project *Man and Biosphere*, established at the 16<sup>th</sup> UNESCO General Assembly in Paris, in November 1970.

In addition, Professor Stanković was the initiator and creator of, or an active participant in, the establishment of many research institutions throughout Yugoslavia: the Institute for Oceanography and Fisheries in Split (1930: he was the temporary chairperson from 1931 to 1932), the Hydrobiological Institute in Ohrid (1935), the Institute for Ecology and Biogeography of the Serbian Academy of Sciences in Belgrade (from 1947 to 1956 he was its director), the Biological Institute of the People's Republic of Serbia in Belgrade (1956-1968, the present Institute for

Biological Research, whose director he was for many years), the Republic Institute for Nature Conservation of Serbia, where he was the first president of the Scientific Council, as well as the Institute of Marine Biology in Kotor, the Biological Institute in Vranjina on Lake Skadar, the Institute for Biology at the Faculty of Science and Mathematics in Sarajevo, the Institute for Biology at the Faculty of Science and Mathematics in Novi Sad, and the Institute for Biology at the Faculty of Science and Mathematics in Priština. Furthermore, during the post-war period, he participated in the establishment of fishing institutes and fishing stations in all the Yugoslav republics. He was one of the founders and first presidents of the Serbian Biological Society (1947) and the Society of Ecologists of Yugoslavia (1973), as well as the founder and first editor-in-chief of the scientific journals *Archives of Biological Sciences* (1949) and *Ecology* (1966), and the editor-in-chief of the journal *Dialectics* (1966).

Professor Stanković was a member of all of the academies of sciences in former Yugoslavia: the Serbian Academy of Sciences and Arts (SANU) in Belgrade, the Yugoslav Academy of Sciences and Arts (JAZU) in Zagreb, the Slovenian Academy of Sciences and Arts (SAZU) in Ljubljana; he was a corresponding member of the Academy of Sciences and Arts of Bosnia and Herzegovina in Sarajevo, and the Macedonian Academy of Sciences and Arts (MANU) in Skopje; he was also a member of several international academies of sciences, such as the USSR Academy of Sciences, the Bulgarian Academy of Sciences, and a correspondent member of the Academy of Sciences in Nancy, and the Masaryk Academy in Prague. He was awarded honorary PhDs by the universities of Grenoble and Nancy in France, and he was a member of many foreign scientific societies, including the American Association for the Advancement of Science, the American Ecological Society, the Zoological Society of France and the Zoological Society of Czechoslovakia.

For his outstanding services in social, political and scientific fields, he received numerous state and social honors and awards. He was awarded the St. Sava of the IV Order medal, the Order of the

People's Liberation, the Order of Brotherhood and Unity, the Order of the Republic, the Order of the Yugoslav Flag, and the Order of Service to the People of the First Order. He also received a Plaque of the University of Nancy, Plaque of the Society for Agriculture and Fisheries of the Republic of France, the July Seventh Plaque for Lifetime Achievement, the AVNOJ Award, a Silver Plaque of the Czechoslovak Academy of Sciences, the Belgrade Memorial Plaque, the Serbian Biological Society Charter, and a Plaque of the University of Cyril and Methodius – Skopje. In addition, Professor Stanković was elected the first honorary member of the Serbian Biological Society and Ecologists of Yugoslavia Society, as well as the first honorary citizen of the city of Ohrid. Today, a street in our capital city Belgrade bears his name. In giving the name Siniša Stanković to the Institute for Biological Research in Belgrade and by organizing several scientific symposia in his memory, his many associates and former students have expressed their immense gratitude for the lasting creative work he left behind.

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