ACADEMICIAN, PROFESSOR ĐJURO KUREPA (1907 – 1993)

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Đjuro Kurepa (read Jo͡oro Kurepa) was born in Majske Poljane, near Glina, Serbian Krayina, in Yugoslavia, August 16, 1907. He received his undergraduate degree

from the University of Zagreb in 1931, where he worked for a while before going to Paris, to the Sorbonne, in 1932 for his graduate studies. He was under the direction of M. Fréchet and received his doctorate in 1935 with his Thèse de doctorat *Ensembles ordonnés et ramifiés* (P. Montel presiding). The thesis is still a source of ideas and inspiration. He was a mathematics professor at the University of Zagreb from 1938 to 1965, and subsequently joined the University of Belgrade. He was a member of both the Yugoslav and Serbian Academies of Sciences and Arts and a recipient of highest honors for his scientific work. He was president or vice president of many a mathematical organization, including the International Committee for Mathematical Education. He was the founder of two journals, and on the editorial boards of ten journals published in different corners of the world.

The wide and significant creative work of Kurepa includes around 250 bibliographic items in mathematics out of about 600 in his total published opus. The most well known are his works on ramified sets (pseudo trees) and trees, which he saw as a generalization of both cardinal and ordinal numbers — an approach later developed by G. Birkhoff. His considerations of various properties of trees (e.g. Suslin's property) and his claims of the same to be postulates of set theory were proved considerably later, with the advent of powerful new methods, through the works of Bukovsky, Chang, Jech, Lévy, Rowbottom, Silver, Solovay, Stewart, Tennenbaum.... The most notable is that of existence of a (Kurepa) tree of height $\aleph_1$, width $\aleph_0$, with more than $\aleph_1$ uncountable branches. It has been shown that there are models of **ZFC** where Kurepa trees exist and those where they don't. Kurepa's generalization of a distance function to domains that are arbitrary ordered sets was developed by A. Weil into the theory of uniform spaces. Kurepa's discovery (published in 1939) of what was later called Ramsey theory (Partition Calculus) was overlooked (see Erdös' review in *Mathematical Reviews* **23** (1962), #A2341 and Kurepa's review in *Zentralblatt* **411** (1980), #54007). M. Krasner used his ideas in a theory of definitions. Some of the notions bearing his name are as follows: Kurepa trees, (generic, weak) Kurepa's hypothesis, Dedekind-Kurepa completion, Kurepa extension, Kurepa-Dokas complement, Kurepa-Fréchet space, Kurepa's antichain condition, the Kurepa continuum, Kurepa dendrity, cellularity and stellarity of a space, Combinatorial principles of Kurepa and Prikry, Maximal theorem of Kurepa, Kurepa's left factorial problem. The latter is one of a number of Kurepa's yet unsolved problems: For a natural number n, define the left factorial function by $!n = 0! + 1! + \ldots + (n-1)!$ The problem is to prove or disprove that the greatest common divisor for $!n$ and $n!$ is 2, for $n > 2$. These contributions are mainly in set theory and topology, but some of them are in fixed-point theory. The latter was the subject of Kurepa's second dissertation — a second dissertation being a requirement in France at that time. His additional contributions were in graph theory and number theory, as well as in analysis and matrix theory. His well-written books *Set Theory* and *Higher Algebra* (in Serbo-croatian) inspired many generations of students.

Kurepa neither belonged to a clique nor did he have his own. His following consists of

a numerous and growing body of mathematicians influenced by his work, whether they knew him or not. Statements like "I am working on such and such Kurepa construction; I've heard of this mathematician, but I do not know him" were often heard among graduate students. Kurepa was the advisor for close to fifty doctoral dissertations (among them S. Kurepa, S. Mardešić, S. Todorčević) and for as many master theses.

Kurepa unrestrictively shared his ideas with his students and colleagues, regardless of whether he was working on them or not. His encyclopaedic knowledge in the areas of set theory, topology, measure theory, ordered structures, algebra, combinatorics, history, real functions, etc., was an asset everybody was welcome to use. Reading his reviews (there were close to a thousand, over 300 of them in *Mathematical Reviews* alone) is rather informative: he gives credit where it is due, points to easier proofs and connections, and refers to priority of the results, sometimes his own and sometimes going back a few decades.

Kurepa spoke at least four foreign languages and wrote and read many others, including Esperanto. Widely traveled in his mathematical endeavors, he may have visited all the world countries where there was advanced mathematics, and lectures at places such as Peking, Moscow, and Warsaw, going to Paris, Princeton, and Berkeley. The great number of his scientific acquaintances included Banach, Hilbert and Hausdorff, as well as Einstein and Marie Curie.

The 6'3" wide-shouldered Kurepa maintained a sound health both of his body and his mind throughout his whole life. He swam in all seasons and it was hard for his much younger students and colleagues to keep up with him ascending a staircase. His most recent activities included travels to far-away conferences, several colloquia, and papers in preparation. His comments were as insightful as ever, his suggestions ever more sharp.

This greatest Serbian and Yugoslav mathematical name has gained a permanent place in the art of mathematics, but more importantly, it has become a property of the world, with ever increasing numbers of papers, dissertations and presentations on the topics either introduced, inspired, or initiated by Kurepa.

We learned the sad news that Professor Kurepa died on November 2, 1993. With sadness for his departure, many of his undergraduate and graduate students as well as colleagues throughout the world add the joy of having had a privilege to know such a great mathematician and a human being.