How modern logic came to Hungary?

András Máté

My talk highlights some persons and events that played an important role at the beginnings of studying and teaching modern logic and philosophy of mathematics in Hungary.

The first great Hungarian mathematician working in foundational research was Gyula/Julius König. His posthumous book *New foundations of logic, arithmetics and set theory* is an interesting document of the history of logic and philosophy of mathematics although it did not became a part of the mainstream.

König's work didn't have an immediate continuation. In the 1920's, John von Neumann became an important figure of the Hilbert school. His results together with Ackermann became apparently very near to a finitary proof of the consistency of elementary arithmetics. As Gödel's theorems proved that the original goal of the research can never be reached, Neumann gava up working at this area – but before that, he drew Kalmár's attention to it. Kalmár and his fellow and lifelong friend Rózsa Péter gained quickly international repudiation for their work. Kalmár didn't agree with Neumann that Gödel's second incompleteness theorem proves the final failure of Hilbert's program. His reformulation of Gentzen's consistency proof is again an interesting piece with more than one important lesson. The introduction of logic and set theory into the education of mathematicians and math teachers was the merit of Kalmár and Péter again, in the 1950's. Kalmár in his lecture notes *Foundations of mathematics* made an attempt to elaborate a 'dialectical materialist' philosophy of mathematics.

The interest of Hungarian philosophers in the new logic awoke rather early after its first appearance in Hungarian mathematics, not independently of Kalmár's and Péter's efforts to draw attention to it. However, its introduction into the education of philosophy students became a much more difficult history. It was the sociologist and polyhistor Sándor Szalai whose lectures in logic at the Faculty of Humanities of the Eötvös University were based on mathematical logic in the academic year 1946/47; but his imprisonment finished this attempt and the priority of dialectic logic was declared. Formal logic was just a preliminary study to it and it was meant as traditional logic. At around 1960, Kalmár and Szalai made attempts to integrate modern logic into philosophy education, but with a rather weak success. Some sporadic elements of modern logic appeared on an eclectic way int the education of

formal logic. It was Imre Ruzsa who succeeded – in the seventies, under much more favourable circumstances – to make modern logic the basis of the education of logic at the Faculty of Humanities of the Eötvös University. He influenced also the development of modern linguistics in Hungary and build up a school of logic and its applications in linguistics and philosophy.

In the philosophy of mathematics, the *Grundlagenstreit* and the three classical schoool did not have too much echo in Hungary. After the proto-intuitionism of König, Kalmár and Péter were connected loosely to the Hilbert-school and Ruzsa was a logicist in some sense – but it was not very important for them. The recent philosophy of mathematics does have stronger Hungarian connections. Rényi's *Dialogue on mathematics* is a standard reference in fictionalism. Kalmár's philosophical attempts had a great influence on Imre Lakatos – especially his mathematical fallibilism that remained unchanged before, under and after his Marxist commitments. On this way, his ideas became components of the present-day mainstream, the philosophy of mathematical practice. Mihály Makkai's work belongs to the basis of category-theoretical structuralism.