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Is Logic Ever Foundational?

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INTERVIEW IS LOGIC EVER FOUNDATIONAL?



András Máté studied mathematics and philosophy at the Eötvös University Budapest (Hungary). He began his research in logic and its history as an assistant of Imre Ruzsa. He is currently associated professor of logic at the Philosophical Institute of the Eötvös University. He made his PhD (CSc) at the Hungarian Academy of Sciences about Plato and Frege. His research interests include history of logic and semantics (semantical ideas in Plato's dialogues, Stoic logic, medieval semantics, Leibniz, Bolzano, Frege) and philosophy of mathematics (second-order logic as a framework, philosophical ideas of 20th century Hungarian mathematicians). He wrote four textbooks of logic and its history and several papers about different topics including even aesthetics of music in Hungarian, 14 papers in German and English mainly about the history of logic. He translated works by Plato, Frege,

Tarski, Kneale and Kneale.

Andrew Schumann: *Der Wiener Kreis* is one of the most legendary schools of logic and analytic philosophy. How did it come out in Hungary? Which names? Which ideas?

András Máté: Four years ago our department has finished a common research with the Institute Vienna Circle of the Vienna University about the reception and influence of the Vienna Circle in Hungary. The results of the research have reinforced my previous impressions that this influence was rather poor. Hungarian intellectual life before the First World War was open to new and modern ideas and because of geographical and political reasons, new ideas from Vienna have found especially easily their way to Budapest. But in the inter-war period, Hungary became a bad-tempered, stuffy, conservative and nationalistic country – this was a resentment against the lost war, the huge territorial losses that Hungary suffered from and the continuous economical difficulties in comparison with the dynamic development for a half century before the War. The official, academic philosophy was dominated by conservative tendencies, and a little minority of the intellectual life had their orientation towards innovative ideas coming from the part of Europe lying west from Hungary – mostly towards very different ones from the views of the Vienna Circle. I have found in the journals of that period a few papers by younger philosophers who knew that views and tried to convey them – but nothing more.

During the Communist period, the situation became at first even worse. For the first fifteen years, there was any other mention of the names of scientifically oriented philosophers of the Western world than some condemnatory ideological phrases which displayed mostly the incompetence of their author. In the sixties, the activity of the circle of Georg Lukács changed the situation: they made a requirement for the Marxist criticism of “bourgeois” philosophy that it be based on the accurate knowledge and analysis of the ideas and on arguments, not on pure ideological patterns. But their central interests were not philosophy of science and related topics, either. Nevertheless, György Márkus's translation of Wittgenstein's *Tractatus* (1963) brought a turn on this area, too, and some of his students formed a seminar on the philosophy of science. Their leading personality, Ferenc Altrichter was strongly involved with the philosophy of the Vienna Circle. He translated together with the other leading philosopher of science of that generation, Márta Fehér a thick volume of translations from the writings of members of the Vienna Circle, whose extensive introductory essay (by Altrichter) is the best secondary literature in Hungarian concerning the Circle until today. We Hungarians often quote the words of the poet Endre Ady to characterize ourselves: “people who always come too late.” The ideas of the Vienna Circle could have their liberatory, enlightening function in Hungary of the late sixties at the very last moment in the history (and for rather few people). Their criticism of subtle philosophy operating with obscure, ill-defined concepts and their view of philosophy as analysis and criticism of the conceptual tools of human

knowledge brought some fresh air for their new readers and their critical attitude seemed to be a good example to follow against official Marxism-Leninism but against other, conservative philosophies that dominated the intellectual theatre in the previous period. However, in the seventies and eighties – when the next generation of philosophers could read politically not relevant philosophical literature from the West relatively free – we learned that most of the theses of the Vienna Circle philosophers got refuted by the immanent development of the sort of philosophy partly originated by them.

Another favorable development for the reception of Vienna Circle ideas in the sixties and seventies was that Imre Ruzsa, originally a mathematical logician, came to philosophy and founded modern Hungarian philosophical logic. (He has been my mentor.) His own ideas were not very close to the Vienna Circle, but their works included thorough, competent and objective discussions of Vienna Circle views relevant to his topics – especially the logical views of Carnap. I think in his work did many valuable ideas of the Vienna Circle gain the place they deserve – no more the programmatic foundations of contemporary philosophy, but important pieces of philosophical tradition that everybody who discusses their topics should take into attention.

A.Sch.: Which contributions of Hungarian logicians became the most interesting and promising up until today?

A.M.: Just a brief enumeration of some names and achievements:

Gyula/Julius König (1849—1913), who played an important role in set theory of the first years of the 20th century. In his forgotten posthumous work *Neue Grundlagen der Logik, Mathematik und Mengenlehre* he devised an extremely interesting intuitionist-like “synthetic logic.” Its analysis is my next goal of research.

János/John von Neumann (1903—1957), who didn’t publish in logic (he resigned from publishing his proof of the Second Incompleteness Theorem, acknowledging Gödel’s priority), but had done fundamental work on rather different areas now closely related with logic as set theory, quantum physics and computer science.

László Kalmár (1905—1976), who radically reformulated Gentzen’s proof of the consistency of arithmetic; it was published in the 2nd edition of the *Grundlagen der Mathematik* by Hilbert and Bernays as “Kalmár’s Proof.” He made substantial contributions (together with his student János Surányi, 1918—2006) to the decision problem of the first-order logic (determining decidable and undecidable fragments of the first-order language). His writings concerning the philosophy of mathematics are important and interesting, too; he developed a fallibilist view on mathematics and elaborated critical arguments against the Church-Turing thesis.

Rózsa Péter (1905—1977), who had done fundamental work in the theory of recursive functions – she was one of the firsts who acknowledged the importance of this sort of functions as a model for the intuitive notion of final algorithm.

Imre Ruzsa (1921—2008), who elaborated systems of modal and intensional logic with truth-value gaps and formalized a large fragment of Hungarian language in a gappy quasi-Montaguean framework. He reformulated in an especially elegant and powerful manner the theory of canonical calculi as a metalogical theory and made by that a valuable contribution to the circularity problem of the foundations (set theory versus logic, syntactical versus semantical approach to logic).

Mihály Makkai (b. 1939), whose large and world-wide acknowledged life-work embraces category theory, categorial logic and (category-theoretical) structuralist philosophy of mathematics.

István Németi (b. 1942) and *Hajnal Andréka* (1947), who were disciples of Alfred Tarski and did important work with him on the area of algebraic logic. They and their circle are working in the last years on the formalization and logical analysis of relativity theories. They succeeded in formalizing special relativity theory and its several different fragments (so making it clear what does depend on the maximality of light speed in relativity theory and what not years before the disputes brought for by very probably false empirical results).

A.Sch.: What is logic recently? How has its definition changed since Aristotle, the father of logic? Is it science, art, ability? How much recent approaches to defining logic could you notify?

A.M.: For me, logic is primarily a branch of philosophy and a branch of mathematics at once, and – being a historian who not so much writes but rather reads logical works – an object of investigation. But for other people who use logic it is perhaps more an art or ability. I don't think definitions are too much important at such a pre-theoretic or metatheoretic level – the limitations of exactness are obvious. Aristotle doesn't give a general definition that embraces the whole area of the *Organon* although at the beginning of each essay he defines more or less exactly the topic of that special investigation. I think it is a characteristic – and, for me, very attractive – feature of logic that it interferes and overlaps with several other areas. It is due to the central position that logic occupies in the structure of human knowledge. The borders between logic and other areas are elastic, historically changing and not always clear (they needn't to be).

A.Sch.: What is classical logic? Has the difference between classical and non-classical logic any sense still? How much do logical systems exist? How can they be classified? Which logical system is closer to our real thought?

A.M.: The term 'classical logic' has a technical sense: strictly two-valued, extensional logic. There is an important and widely disputed philosophical thesis connected with classical logic in this sense: that it has a distinguished role within the plurality of logical systems. It has adherents and enemies – I'm a moderate, a bit sceptic adherent of the thesis. The distinguished role may consist in that classical logic should be the most general system of connections between truths that there are somehow in the world, independently of our discovering or thinking them. I.e., according to this thesis, logic is primarily about truth and not about thinking, and it is more connected with metaphysics than with epistemology. If we identify classical logic as *the* logic or exaggerate its distinguished role, we must accept radical realistic consequences that I don't want to accept. Nevertheless, classical logic works somehow as a zero hypothesis about the world (and not about our thinking) and in that sense it is unavoidable and hardly exchangeable for some other logic. We do and should study several different logical systems and apply them on different areas but in most cases (even if not always) our metalanguage argumentation about them is governed by classical logic.

A.Sch.: Modern logic is developing now as applied logic above all. Are fundamental logical researches still possible? Where?

A.M.: I agree that within contemporary research in logic, the continuation of the investigations by Gödel or Tarski loses step-by-step its importance and innovative force. Our great ancestors had done the great work and there is not too much to add to it. But logic was never substantially developed on such a cumulative way. The great schools or trends after the originator Aristotle – Stoic, Medieval and mathematical logics – have begun always with a radical change of method and theoretical framework. The medievals and the first mathematical logicians (I mean Leibniz and Boole) hardly did anything more at the beginnings than reproducing the old results within the new (supposition-theoretic resp. algebraic) framework. I think such a change of the framework (I try to avoid using the word 'paradigm') is quite possible. Of course I don't think that mathematical method in logic could be rejected but the Frege-Hilbert-Tarskian calculus-plus-(set-theoretical) semantics construction may be changed by some other mathematical framework. Just some guesses: combinatoric logic or category-theoretic logic – theories that exist for decades now – may gain by some development the role of the general framework of logic instead of being somewhat exotic branches of it.

On the other side, I don't find appropriate the label 'applied logic' for a considerable part of contemporary research. E.g. the above mentioned works in physics-plus-logic or several

investigations on the borderline of logic and linguistics are not just applications of logic but characteristically foundational researches. I don't find anything wrong or derogatory in calling something applied science, but I think applied and foundational research are just different in many respect and I would call these and similar studies interdisciplinary foundational research.