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A PAGE IN THE POLISH HISTORY OF LOGIC: JAN ŁUKASIEWICZ AND JAN SALAMUCHA

Abstract:

The paper is divided in two parts the first of which contains the philosophical background, the origin and the program of the *Cracow Circle* of which Salamucha was one of founders. The second part underlines strictly Salamucha's studies in the field of the history of logic. The final part is an attempt to compare the reciprocal influence of Łukasiewicz and Salamucha.

The radical development of mathematical logic created new, manifold possibilities of its application to philosophy, not only in terms of a traditional (in the Aristotelian sense) "tool" useful for logical analysis, but also in terms of its modern and much more sophisticated meaning (mathematical and philosophical logic). Scholars who wanted to renew Christian philosophy realized that the task was only possible as a common study for philosophers well acquainted with mathematical logic. The relationship between Catholic thought and mathematical logic was the subject of a special meeting organized on 26th August 1936 in Cracow during the Third Polish Philosophical Congress. Thirty two people took part in that meeting, mostly readers in philosophy of different Polish theological faculties and seminars. But those who should be particularly named are Rev. Józef Maria Bocheński, Jan Franciszek Drewnowski, Rev. Jan Salamucha and Bolesław Sobociński, all founders of what is referred to as the *Cracow Circle*. The *spiritus movens* of the four above mentioned philosophers was the famous

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medievalist Rev. Konstanty Michalski. At the meeting Jan Łukasiewicz himself was also present.

1.1. The philosophical program of the *Cracow Circle*

Łukasiewicz played an extremely active role in the works of the *Circle* not only through his physical presence but especially his papers. The *Cracow Circle* took his short article of [1927] as the concept of radical reform in philosophy. He postulated an axiomatic method as the only worthwhile method of scientific philosophy. He stated that it should be based on few axioms, all of them possibly clear and sure, with their various meanings explained by examples. All other results should be deduced from axioms and constantly confronted with the data of both intuition and experience as well as with the results of other disciplines, especially natural sciences.

But the *Cracow Circle* found the program of Łukasiewicz too radical to be applied to Christian philosophy, especially Thomism, so the program had to be modified. The modification was applied mostly, on the one hand, to methodological and epistemological problems of theology as a science, and on the other, to the defense of philosophical “neutrality” of mathematical logic (not to be confused with antimetaphysicism, conventionalism, atheism, relativism and so on). They simply postulated the reform not the traditional topics of Christian philosophy but rather its method of resolving them, wishing to support traditional logical apparatus (Aristotle’s syllogistic) by modern calculus of propositions and calculus of relation.

1.2. Salamucha and Thomism

Salamucha was an ardent supporter of Thomism (see Sobociński [1958] p. 328-331) of which he acquired a profound knowledge during his studies in Warsaw and Rome. It was Salamucha’s professor

and doctoral adviser at Warsaw University, Rev. S. Kobyłecki, who exercised a very decisive influence upon his attitude and scholarship. He demanded that his students should, in addition to lectures on theology, attend those given in other departments. It was on his advice, that Salamucha began to study mathematical logic and the foundations of mathematics, two courses given in his time by Łukasiewicz and Leśniewski. These subjects interested him to such an extent that even after he received his degree and became a professor at the Warsaw Seminary, he continued to attend the lectures and seminars. This gave him a deep understanding of both disciplines, and also an insight into the whole field covered by the Warsaw school of logic.

While he taught logic and Thomistic metaphysics at Warsaw and Cracow, Salamucha also demanded that his students have a basic acquaintance with mathematical logic. He endeavored to present the Thomistic system so that its arguments be logically correct. He soon realized that many of St. Thomas' proofs, though intuitively convincing and correct, could not be satisfactorily set out in the framework of traditional logic. Thus, systematically, he began to analyze them from the point of view of mathematical logic introducing it profoundly into his courses on metaphysics. One of his brilliant contributions in this field was [1934], which shows that behind the intuitively correct and apparently easy arguments of St. Thomas lie relatively complicated logical reasoning. Publishing this study he tried to convince the theological circles in Poland that mathematical logic could be a useful and even necessary tool in theological studies. Salamucha's efforts were not without results, as the book *Catholic Thought and Contemporary Logic*, published in 1937 shows. Thus, in spite of initial distrust and a negative attitude towards it, mathematical logic gradually began to be accepted in Polish theological circles (see Sobociński [1958] p. 331).

2. Towards a history of logic

It is mainly in the field of the history of logic that Łukasiewicz's influence on Salamucha can be traced. Łukasiewicz was invited by the School of Theology in Warsaw to be a doctoral examiner of Salamucha, and later was asked by the theological school in Cracow to serve on the board evaluating his scholarly contributions before his appointment as a privat-dozent. Łukasiewicz's lectures gave Salamucha not only a knowledge of the theory of propositions, but moreover, they made him understand all the insufficiencies and shortcomings of traditional logic. At that time, Łukasiewicz had already begun his well-known research in the history of logic, the results of which he later published in a treatise, *Zur Geschichte der Aussagenlogik* (Łukasiewicz [1935]) and *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic* (Łukasiewicz [1951]). Łukasiewicz frequently discussed the results of his research in his lectures, emphasizing the fact that traditional logic was not completely true to the original Aristotelian system. He also pointed out that the Stoics discovered the calculus of propositions, which was later completely forgotten. Fragments were again discovered, independently, by later scholastics and by the 16th and 17th century Jesuit logicians. Unfortunately, the fragments again sank into oblivion.

Moreover, Łukasiewicz, during his lectures, frequently analyzed classical philosophical texts demonstrating that some of the arguments found there were inaccurate in the light of mathematical logic and that even the true and acceptable conclusions were sometimes not logically demonstrated. Prompted by Łukasiewicz, Salamucha began to analyze Aristotelian texts himself. Some of the results of that work are contained in his study written in 1930. The lectures of Leśniewski gave him not only the knowledge of mathematical logic of higher level and the foundations of mathematics, but also a deep un-

derstanding of antinomies. He published an article in 1937 - [1937b] - with the results of his studies in this field.

Under the influence of Łukasiewicz and Michalski, Salamucha became very interested in the history of 14th century philosophy and late medieval logic. The result of his studies in this field were three extremely important studies: [1935], [1937b] and [1960], the last one was finished during the war but published many years later. He tried to show the origins of 14th century nominalism and its impact on the present logico-philosophical tradition. The first article, *Logic of Propositions in William of Ockham*, was based upon unpublished medieval manuscripts. In it, he proved the hypothesis of Łukasiewicz that independently of the Stoics, Ockham (and his immediate followers) discovered the calculus of propositions. Salamucha summarized the importance of this study and proved the following statements: a) Ockham had a quite correct and precise notion of the material implication, b) the theory of propositions in Ockham was relatively well developed - he quoted 27 formulas explicitly mentioned by him in comparison with only 24 of the syllogistic; c) in Ockham, the theory of propositions was logically earlier than the syllogistic. The second work, *The Appearance of Problems of Antinomies in Medieval Logic*, again based on unpublished manuscripts, threw a completely new light upon these problems. Salamucha showed that in the late Middle Ages, during a period of the so-called *logica modernorum*, not only were the antinomies vigorously discussed but the discussion was not limited to the form of antinomy of the liar. It also ranged over the other antinomies belonging to the semantical type. The arguments cited by Salamucha indicate that these logicians proposed to solve the semantical antinomies in a way similar to that adopted in contemporary logic. His efforts, based on the texts he discovered himself in the Bibliothèque Nationale in Paris, confirmed the observation of Michalski that Ockhamists were on the threshold of many-valued logics, and also demonstrated that such re-

search was already well underway in the late 14th century. The third study, *From the History of Medieval Nominalism* is a very detailed and profound study showing the role Petrus Aureoli played in the late medieval nominalistic tradition.

3. Łukasiewicz and Salamucha

Salamucha regarded Łukasiewicz as the most famous Polish historian of logic. He often cited the results of Łukasiewicz in his works and followed his advice as well. In [1937b, p. 87] he mentioned that it was Łukasiewicz who directed his attention to an unknown text that was very important to his analysis. But Salamucha was a very critical reader of Łukasiewicz - his results (always explicitly mentioned in comparison to Łukasiewicz who never quoted Salamucha's or referred to him as his successor!) were only the starting point for his own studies. Moreover, when Salamucha did not agree with Łukasiewicz (see his modification of Łukasiewicz's classification of reasoning), he exposed his opinion in a very discreet manner, saying for instance, "I have only made some terminological changes ... to make it more adequate to current language".

Łukasiewicz wrote his articles in a very brilliant way, emphasizing his logical, philosophical and historical erudition. The works of Salamucha were written in a scholastic manner; his style was full of Latin words and there were many footnotes. It can be even said (see Żarnecka-Biały [1995, p. 44] that some works of Salamucha [1930, 1935, 1937b and 1960] are simply "double works", meaning that beside the proper text, there is another one sometimes more important in footnotes. Salamucha was very reliable in his writings. The final statements of his studies were always preceded by detailed analysis carried out with the full precision of logical "apparatus" used by him.

Would it be correct to say that Salamucha was the disciple of Łukasiewicz? It might be, but only in the large sense of “being a disciple”. There were influences of Łukasiewicz on Salamucha, for example: a) the application of Łukasiewicz’s method in studying of history of logic, b) the use of Łukasiewicz’s notation (even at the cost of a slight mistake - see the “list of theorems” of Ockham’s theory of propositions, esp. “CKCKpqrKCsNqCtNrCKpts”) and c) the acceptance of Łukasiewicz’s advice as the starting point of Salamucha’s own results. However, Salamucha was most certainly an independent thinker and the impact of his studies are the result of his many years of prolonged and difficult work.

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