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in collaboration with
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Polish Logic in Postwar Period

1. Introductory Remarks

During the 10th Congress of Logic, Methodology and Philosophy of Science (Florence, August 19-25, 1995), I took part in a panel discussion on the situation of logic in Eastern Europe during the time of Soviet domination. This essay, originally written to celebrate the 50th anniversary of the Polish Academy of Sciences¹, is primarily based on the paper I presented on that occasion². The list of people with whom I consulted while preparing first the Florence paper and then the present one is rather long.³ I appreciate the assistance of all of them. My special thanks are due to Wojciech Buszkowski, Andrzej Grzegorzczak, Witold Marciszewski, Wiktor Marek, Roman Murawski, Jerzy Tiurnyn and Jan Zygmunt, who in addition to offering various suggestions, remarks and criticism provided me with brief overviews of selected areas of logical investigations carried out by Polish logicians. The postwar Polish logic is too rich and too diversified for one person to be able to present it in an adequate manner, and I would not have been able to complete this paper without these people's kind assistance. Yet, it goes without saying that the final responsibility for this paper is mine. I tried as far as I was able to evaluate critically all pieces of information I was offered and occasionally revise them. In this manner, the Polish version of this survey

¹The Polish version "Logika polska okresu powojennego, próba rzutu oka wstecz" of this paper was published in *Nauka* 4(2002), 157-175.

²"The Postwar Panorama of Logic in Poland", in: *Logic and Scientific Methods*, eds. M.L. Dalla Chiara et al., Kluwer 1997, 597-608.

³Various suggestions regarding the earlier "Florence" version of this survey were offered by: Janusz Czelakowski, Andrzej Grzegorzczak, Jacek Malinowski, Marcin Mostowski, Roman Murawski, Ewa Orłowska, Witold A. Pogorzelski, Kazimierz Świrydowicz, Max Urchs, Jan Woleński, Andrzej Wójcik, Jan Zygmunt. While preparing this version of the survey I received assistance from: Zofia Adamowicz, Wojciech Buszkowski, Janusz Czelakowski, Witold Marciszewski, Wiktor Marek, Roman Murawski, Jan Mycielski, Mieczysław Omyła, Jerzy Pogonowski, Jerzy Tiurnyn, Anita Wasilewska, Andrzej Wiśniewski, Jan Woleński, and Jan Zygmunt.

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was prepared in cooperation with Jan Zygmunt, who was also the author of the initial draft of its English version. The latter was accessible on the *Studia Logica* home page for quite some time. Eventually, I rewrote its various parts taking into account suggestions offered to me by its readers. Of those, I particularly appreciate the remarks and comments offered by Z. Adamowicz, J.M. Dunn, W. Marek, R. Murawski, Z. Pawlak, J. van Benthem, and H. Wansing. I also express my gratitude to Tom Brunty who took the effort to polish this translation.

This paper was, in its initial form, addressed to a rather large audience, and though this time its expected readers are logicians, its “popular” style has been preserved. Thus, in particular, various rather “loose” definitions meant to explicate various technical notions to the reader whose knowledge of logic is limited were neither removed nor replaced by definitions thought to be more accurate.

2. Definition

The term “logic” is rather ambiguous, yet the question of how it should be understood is crucial for delimiting the scope of this paper. Thus, even though no answer to this question is likely to gain approval from all whose opinion on the matter should be considered, I do not think I should avoid undertaking it.

“Logic” (in the basic meaning of the term) is the formal theory of reasoning. Thus, it is a theory whose chief concern is to state conditions that an argument should satisfy in order to be valid. One method of approaching this issue consists of reducing the notion of the validity of an argument to that of the validity of a “rule of inference”. The idea here is that an argument is valid if and only if its conclusion has been derived from premises by using valid rules of inference.

The logical analysis of reasoning is carried out under the assumption that both the premises and the conclusion are sentences rather than someone’s beliefs or suppositions. The sentence is a syntactic concept and quantity and thus it should be defined in terms of vocabulary and the syntactical rules that govern the language examined. On the other hand, the notion of validity is related to that of truth and thus is a semantic one. Consequently, its purely syntactical definition is not available.

As is rather clear from the remarks above, logical investigations, both in their syntactic and semantic versions, are bound to be strongly related to and often to overlap linguistic ones. Even though logicians limit their linguistic analyses to languages deprived of numerous peculiarities characteristic of

“natural” languages (i.e., to languages one might call “ideal” or “idealized”), those languages are by no means “artificial”, as is often claimed. The relationship between idealized languages as the objects of logical analyses and natural languages is much the same as that between theoretical models of phenomena and the phenomena they represent, e.g. between a system of mass points whose behavior is described by Newtonian Mechanics and the system of corresponding real, three-dimensional physical objects.

If sentences examined by logicians were treated as someone’s beliefs or suppositions, the logical theory of reasoning would be both relevant to and dependent upon results of investigations into human mental capacities. From the point of view of cognitive psychology, reasoning is not merely a sequence of operations on sentences (as the logicians maintain), but is a mental activity of a human being. If logic is not a part of psychology, as was maintained until the beginning of the 20-th century, it is not because it treats notions like reasoning, belief or supposition as merely informal and thus dispensable, but because its laws are not experientially grounded. Logic is a formal science and, as all formal sciences, notably mathematics, it is concerned with some “arbitrarily chosen” set of assumptions that define the objects (or rather the system they form) to be investigated. The domains of logical investigations are known as “logical systems”. The fact that a logical system is determined by “arbitrarily chosen” assumptions does not mean that the selection of such assumptions is not governed by restrictions. Whenever a new logical system is proposed, one expects that it will be useful in dealing with either theoretical or practical problems of considerable significance.

Most often a system of logic is defined as a set of sentences (more broadly, well-formed formulas) that are “logically true”, i.e. true regardless of how one understands the “nonlogical terms” they contain. Since the chief task of logic is to state conditions for valid reasoning, besides defining the notion of logical truth, the definition of a logical system should instruct the user as to how the concept of logically valid inference might be reduced to that of logical truth. An alternative way of defining logic consists of defining the notion of a logically valid inference directly, rather than in terms of logical truth. Thus there are two alternative ways to define a logical system. One might respectively call them “sentential” (where the logical truth of a sentence is of primary substance) and “inferential” (where the key notion is that of a valid inference).

Seeking to comply with different logical intuitions, logicians arrive at different systems of logic, or different “logics” for short. The system known as classical logic is of special significance for it provides a formal basis for all standard mathematics.

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