Naming Logic(s) – Symposium Proposal for LMPS’2015 - Helsinki, August 3-8, 2015

Section: A2 Philosophical Logic

General description of the symposium
The idea of this symposium is to discuss the names used to qualify logic and/or the names for the different (classes of) logic systems.

Modern logic has been qualified in various ways: “symbolic logic”, “formal logic”, “mathematical logic”. What does all this mean? For example “mathematical logic” is typically an ambiguous expression since it can mean both logic treated in a mathematical way or/and the logic of mathematics. “Symbolic logic” is also a mixture of different things. It can make reference to the use of some formal mathematical signs, or some pictures like Venn’s diagrams. “Formal logic” is an expression put forward by Kant but ironically it has been often used to denote modern mathematical logic by opposition to traditional logic.

Concerning the names of systems of logic, there is also a lot of ambiguity. In which sense is classical logic “classical”, intuitionistic logic “intuitive”, linear logic “linear”, relevant logic “relevant”, free logic “free”, minimal logic “minimal”?

Talks of this symposium will try to answer some (not all) of these questions. This is part of an international research project.

Paper 1: What makes symbolic logic “symbolic”?
In the late nineteenth century and early twentieth century, the theory of logic knew significant developments that led to what is commonly known as “modern logic”. Several names were coined to name this new science: “algebra of logic”, “mathematical logic”, “symbolic logic”, “logistic”, etc. This picture reflects the heterogeneity of these early investigations carried out by logicians who were often isolated and were competing with each other as to the best logical system and notation. It is much later than the new logic was established as a discipline on its own and logicians formed a community with the foundation of the Association for Symbolic Logic in 1936.

The expression “symbolic logic” that was favored by the association’s founders, makes explicit what was common to all those new logical trends: the appeal to symbolism. Although early occurrences might be found, the expression “symbolic logic” seems to have been popularized by John Venn who used it in his writings to identify the logic that was developed after George Boole’s mathematical theory of logic. Symbolic logic differed from traditional logic in its thorough and systematic use of symbolism. Several rival symbolisms were developed and logicians often provided spontaneous theories of sign to support the notations they designed. However, this practice raised several issues that were in dispute among logicians as to the signification and the manipulation of those symbols in logical calculus. The object of this paper is to address these early disputes as to what makes symbolic logic “symbolic”.

Paper 2: Formal and transcendental logic
While the term “formal logic” does not seem to have today an unambiguous, precisely defined meaning, the term “transcendental logic” is rarely used at all, except in a historical context. Despite of that, both terms, if traced back to their historical origins, show their modern relevance, although with certain limits. We, first, give an overview of the most common ways in which the term “formal logic” is encountered in contemporary literature, and relate it to the concepts of “formalized language” and “formal system”. We then turn to the historical origins and delineate the concepts of formal and transcendental logic as they are conceived in I. Kant. We analyze the meaning of “logical form” within Kant’s “functional” account of formal logic. A possible formalization of Kant’s primitive concept of the formal unity of apperception, which lies at the foundations both of his formal and transcendental logic, reveals what should be for Kant a fundamental “structure” included in any logical form. Although Kant’s formal logic seems to be restricted to a narrow area of some traditionally well-known logical forms, we show that it also comprises an outline of sort of paraconsistent and paracomplete logics. We then describe some limitations of Kant’s conception of formal logic, which, unlike mathematics, remains unsusceptible to a “symbolic construction” of concepts. Finally, we show in which way Kant’s transcendental logic can be described as a higher-order and model-theoretical framework comprising a first-order subtheory of empirical appearances. We claim that modern formal semantics and formal ontology are the main successors of Kant’s transcendental logic. On the other side, despite of some essential connections, no
logic seems to be today a strict successor of Kant’s formal logic as a general logic of all our thought. Hence, formal logic in a strict sense remains to be only a “regulative idea”, directing a most general logic research to its ideal endpoint.

Paper 3: What is pure in Husserl’s idea of pure logic?
Emerging in 1895 and set out in the last chapter of the Prolegomena (1900), Husserl’s idea of pure logic is the cornerstone the Logical Investigations (1901). In that respect, the logicality of the six investigations can be viewed in the light of the purity of pure logic. But what is pure in it? what does pure mean in Husserl’s idea? or, more precisely, what conception of logic does the epithet pure involve? Such questions bring first and foremost the demarcation of the field and the identification of the status of Husserl’s idea into play. Once that field characterized by the rejection of any psychological or empirical ground and by the focusing on the ideal (a priori, analytic, formal) structure of scientific theories in general, once the status of pure logic defined as the nomological science determining the possibility of theoretical knowledge, what the understanding of the purity of pure logic puts at stake is the structuring of Husserl’s idea. Husserl configures his pure logic mainly on two levels: an upper one dealing with the relation linking a system of axioms to its formal domain (the level of formal or ‘mathematizing’ logic); a lower one, grounding epistemologically the former by setting the categories and laws of its ontological and apophantic dimensions (the level of the pure theory of parts and wholes and of the pure morphology of significations). And when the linkage of those two levels is understood from the viewpoint of Husserl’s semiotics Logical Investigation, I), what is finally highlighted is that the purity of Husserl’s pure logic involves a conception of logic which attempts to get a conception of truth harmonizing a theory of (logical) knowledge and a theory of meaning (via the notion of intentionality). In that sense, pure means here nothing but a systemic and transcendental extension of formal logic.

Paper 4: On the minimality of minimal logic
The system, which we know as minimal logic, is a paraconsistent version of intuitionistic logic by A.Heyting. It received his name after the work of Ingebrit Johansson (1937). The situation with this logic is a little bit unhappy. On one hand, it was not considered by constructivists as a serious alternative to Heyting logic. On the other hand, specialists on paraconsistency like to emphasize that this logic is only formally paraconsistent due to its negation destructive character: all negated formulas are provable in every inconsistent theory over minimal logic. However, this logic has a very remarkable history. It was suggested for the first time by Andrey Kolmogorov (1925) as the first formalization of intuitionistic logic, the well-known Glivenko theorem was also proved for the first time not for intuitionistic logic, but for a system closely related to minimal logic. In this talk I will survey the details of the early history of minimal logic and discuss the question of its minimality. For Johansson, the choice of the name “minimal logic” was justified by the fact that the negation of minimal logic can be presented as A??, where ? is a constant, about which nothing is postulated. However, Johansson itself anticipated a possible weakening of his system. He emphasized that the negation of a formula in his system should be treated rather as an “impossibility” than a “falsity” of this formula. Later Vakarelov and Dosen suggested systems, where the negation operator is interpreted as a modality of impossibility. It turns out that the minimal negation is a special kind of such operators. This and other weakenings of minimal negation presented in the literature and suggested by the author will be discussed in the talk.