

LEIBNIZ'S SYLLOGISTICO-PROPOSITIONAL CALCULUS

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In his research in logical theory after 1680 Gottfried Wilhelm Leibniz worked intensively at devising a formal calculus that would be interpreted as a general logic. He was convinced that the classical types of categorical propositions were the fundamental ones, so that the central core of his general calculus had to consist of the theory of the syllogism. He conceived the rest of the logical relationships between propositions as developments of syllogistics. Thus, the calculus he was aiming at was *not* to be merely a calculus that could have a double interpretation: as a syllogistic calculus and, alternatively, as a calculus of other types of implication. His general calculus was to have the principles of syllogistics *and* the other logical principles together at once. His calculus would be powerful enough to handle mixed inferences involving classical syllogisms and other reasonings.

Undoubtedly because of his algebraic researches and his view on the nature of truth, Leibniz took it for granted that a fully satisfactory logical calculus must be an equational one. Thus, his first efforts at treating the theory of syllogism were directed toward the construction of an equational syllogistic calculus. (And he anticipated some equations of Boolean algebra.) His *General Inquiries about the Analysis of Concepts and Truths* (1686), referred to here as [1],¹ contains a series of reflections on the syllogistic equations. He tries several approaches, and discovers some valid equations. But two things are of special interest to us now: (i) Leibniz formulates there principles that allow the generalization of syllogistics to propositional logic; (ii) Leibniz moves toward a higher level of abstraction. In his [2], *The Primary Bases of a Logical Calculus* (August 1, 1690), he takes up the topic again, and this time he begins with general logical principles and discusses applications to syllogistics. He distills the general system in [3], *The Bases of a Logical Calculus* (August 2, 1690).

My purpose here is to examine critically the system slowly developed by Leibniz in those three papers. I want to determine how close he came to formulate, or conceive of, a calculus that is at once adequate for both syllogistic and propositional logic. Naturally, the precise way of measuring the degree of accomplishment of his efforts consists of the completion of