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SYLLOGISTIC INFERENCE WITHIN THE PROPOSITIONAL CALCULUS

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There is a way of rendering the syllogism whereby the soundness of any syllogistic inference can be tested by the logic of truth functions, without additional formal notations for properties, predicates, or classes. Although simple, this method is not without interest, for it counters the claim often made in logic textbooks that symbolism and rules of inference beyond those provided within the propositional calculus are required for determining the validity of syllogistic inference. Quine's statement in this regard is typical.[1] At the beginning of Part Two of *Methods of Logic,* immediately following his development of the logic of truth functions, Quine asserts: "There are many simple and logically sound inferences for which the foregoing techniques are inadequate."[2] His example is a syllogism of the form EIO, figure 1, the validity of which is shown on the basis of truth functions in the fourth paragraph of this paper.

Let numerals for the numbers 1 through 7 be propositional variables, interpreted for our purpose as follows:

(1)	Something is A and B and C
(2)	Something is A and B and not C
(3)	Something is A and not B and C
(4)	Something is A and not B and not C
(5)	Something is not A and B and C
(6)	Something is not A and B and not C
(7)	Something is not A and not B and C.

Although notations for properties (or predicates, or classes, as the reader will) appear in the column to the right, only notations for formally unanalyzed propositions appear either in the left column or in any demonstration which follows. The syllogism is brought within the range of truth functions by informal interpretations of propositional variables which in no way are reflected within the operations performed upon these variables in testing the validity of the corresponding formal arguments.

Since something is A and B if and only if either something is A and B and C or something is A and B and not C, the categorical statement 'Some

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