

A LOGICAL CALCULUS OF ANALOGY
 INVOLVING FUNCTIONS OF ORDER 2

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1. INTRODUCTION The logic of analogy is hardly an uninvestigated subject. At another place,¹ we consider the syntax and pragmatics of analogical arguments. Bocheński,² under the inspiration of Aquinas and Cajetan,³ has given some thought to the semantics of analogical statements, and recently Hesse⁴ has proposed a theory of analogy that both involves and presupposes some of the results of 1. However, it would seem that little, if any, effort has been expended on a detailed formal description of the logic of similarity or likeness. In this respect, the logic that follows should be thought of as a methodological proposal. Whatever its difficulties, it at least purports to show that

(1) analogy (in the sense of similarity or likeness) of individuals can be expressed within the framework of either a standard predicate or a standard set calculus, but

(2) it cannot be so expressed without resort to semantical considerations.⁵

Further, it can be demonstrated that, like that of identity,

(3) this logic of similarity is a model for the logic of the Universal Relation \dot{V} of *Principia Mathematica*.⁶

Finally,

(4) the definition of analogy for sets is not the usual one, in terms of isomorphism. However, under suitable restrictions, the two definitions may be reduced to one another.⁷

2. NOTATION Our logic will be called **A.S.₁**, i.e., proposal of an analogical system for individuals. In stating and developing **A.S.₁**, we make the following assumptions: (1) there exists a standard elementary logic of the sort developed by Quine⁸ and Copi⁹ included in which is a consistent and deductively complete propositional calculus¹⁰; (2) the rules governing the quantification and substitution of predicate variables are formally identical to those for individual variables¹¹; and (3) Post's criterion of consistency is