Abstract: We offer a formulation of first-order logic that is diagrammatic in nature, retains a basic part of C. S. Peirce's own graphics, renders quantification both graphical and easily readable, and seems a natural approach to what lies at or near the foundations of his science of Semeiotic. The approach is in agreement with Peirce's propositional graphics (Alpha EG), but different in its treatment of quantifiers. Our syntax is formulated with the "atoms" of the usual predicate calculus given a fine structure in terms of a bonding operation on monadic, dyadic, and triadic building blocks. A suitable semantics is introduced, based on relative product and culminating with a proof of a precise formulation of the famous Peircean Non-Reduction Thesis (NRT). (In particular, in Theorem B', we document precisely the quantificational aspect of NRT: quantification is a multivalent operation, with full expressivity occurring only for valencies $\geq$ 3.)The principles NRT and RCT (Relational Completeness Thesis) are implicit in predicate logic, whatever form it might take; but their explicit presentation has generally been either neglected (classical predicate calculus) or attended by technical complexities (Peirce's Beta EG, Burch's PAL). Here, the proofs are both explicit and relatively simple. Other contexts in which our "molecular" treatment of relations may be advantageous will be indicated.

Language: English