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AN EXAMINATION OF THE INFLUENCE OF BOOLE'S ALGEBRA ON PEIRCE'S DEVELOPMENTS IN LOGIC

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Peirce was led to the development of innovative improvements in logic through critical investigation of the writings of other logicians, e.g., the traditional system of syllogistic, Boole's algebra, Hamilton's system, Mill's logic.[1] In the following I consider his early reaction to Boole's algebra of logic. In his 1865 lectures on the philosophy of science presented at Harvard, Peirce indicated great respect for Boole's accomplishments but also pointed out many failings in Boole's system [1], [2]. By 1865, twelve years before the first publication of Schroeder, Peirce had read and had begun to work on revisions of the algebra of logic developed by Boole.

One of Boole's most significant achievements, Peirce said in Lecture 6 of his 1865 lecture series [2], was his contribution toward the development of an effective symbolic notation. Indeed, Boole's was not the first attempt at a symbolic notation for logic, but Peirce maintained it was more adequate than previous attempts in fulfilling the aims desired from using such a notation. Ordinary language, with its ambiguities and richness, is inadequate for the investigation of logical form, Peirce explained. The symbols most effective for the science of logic should have the powers of diagramming significant linguistic forms and of aiding in the analysis of the laws of the necessary relations between such forms. Peirce felt that Boole's symbolization was the first significant *approach* toward fulfilling these objectives,[2] an approach of great value and well worth studying, even though deficient in some respects.

In his 1865 lecture series [2] Peirce said that the application of Boole's calculus to ordinary reasoning involves two fundamental theorems, the first being:

1.1 $fx = xfx_1 + (1 - x)fx_0$.

This rule, Peirce said, enables us to interpret complex expressions. It is also presented in 1867 (3.9) in the following form:

1.2 $\phi x = \phi(1), x + \phi(0), (1 - x)$.

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