

## ⌘ Modern Logic ⌘

Review of *A Peircean Reduction Thesis: The Foundations of Topological Logic* by Robert W. Burch. Lubbock, Texas Tech University Press, 1991.

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Burch's book will be of interest to historians of logic primarily because of its avowed goal of completing a project which was inaugurated by Charles S. Peirce and continued by Peircean scholars, but will teach them little about the history of algebraic logic in general, or about Peirce's work in particular. The author in fact denies that his book is a piece of Peirce scholarship *per se*, stating that it is instead a contribution to original research in an area begun by Peirce. The core of the book is Burch's proof of a formalized version of Peirce's Reduction Thesis, according to which all polyadic relations with more than three terms can be reduced to combinations of monadic, dyadic, and triadic relations. In order to carry out his proof, Burch painstakingly and cleverly develops a formal axiomatic system, dubbed "Peircean Algebraic Logic" or PAL, which is described (p. 5) as "an attempt to amalgamate various systems of logic that Peirce developed over his long career." It takes as its syntactical cue the graphical representation of relational logic that Peirce worked out as the analogues of chemical valency and which were inspired in part by the work of Peirce's British colleague, Alfred Bray Kempe (1849-1922), in applications of algebraic logic to geometry and the work in topology of Johann Benedikt Listing (1808-1882). The topological model finally settled on is Peirce's "existential graphs" for first-order quantificational systems. Burch also makes a connection to more recent work by designing PAL in such a way that some of the features of PAL specifically correspond to features of Paul Bernays' algebraic logic as presented in Bernays' (1959) paper *Über eine natürliche Erweiterung des Relationenkalküls*. Except for systems of logics developed by Peirce scholars and designed specifically to prove the Reduction Thesis, however, Burch largely ignores current research in algebraic logic.

The best example of a system system designed by Peirce scholars for proving the Reduction Thesis, and the one upon which Burch most heavily depends, is Herzberger's (1981) "bonding" algebra, which, however, substitutes for strictly algebraic proof a