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**BRUCE PETRIE**, University of Toronto

*Properly Understanding Lambert's Mémoire on  $\pi$*

Johann Heinrich Lambert (1728-1777) is remembered for being the first to prove the irrationality of  $\pi$ . He presented this proof in his 1768 memoir which he submitted in 1761 to the Royal Academy of Sciences in Berlin. While a crowning achievement in and of itself, Lambert's result deserves to be remembered for a different reason as well. In this work, Lambert was the first to conceive of transcendental numbers as numbers which are not roots of polynomials with rational coefficients. While his memoir is mentioned in anecdotal accounts of squaring the circle, these accounts miss this pivotal development. Squaring the circle did indeed motivate much of Lambert's research, which was only natural given his interest in geometry and perspective. The problem is mentioned frequently in his memoir and motivated his proof that  $\pi$  is irrational. I show that it was also the motivation behind his revision of the vague Eulerian understanding of transcendence.