

1077-E1-2677      **Charlie L Smith\*** ([charlie.smith@park.edu](mailto:charlie.smith@park.edu)), 8700 NW River Park Drive, # 30, Parkville, MO 64152. *The History of Irrational and Transcendental Numbers; Classroom Benefits.*

This talk is the result of an independent study course which I taught in the Spring Semester of 2011. In that course I used Ivan Niven's classic "Irrational Numbers to study beautiful proofs about irrationality and transcendence which are accessible to undergraduate students.

Since then, I have been studying the history of irrational and transcendental numbers, using the abundant resources of the Linda Hall Library in Kansas City, Missouri. The research has not been exhaustive, but I have been able to identify the major players in the game. I will highlight the contributions of Liouville, Hermite, Lindemann, Weierstrass, Hurwitz, Gelfond, Niven and others.

The proofs of Hermite ( $e$  is transcendental) and Lindemann ( $\pi$  is transcendental) are quite long and fiendishly complicated. The ensuing years witnessed the discovery of new techniques and specific refinements which resulted in shorter, clearer proofs. The process seems to culminate in Niven, who published both a one-page proof of the irrationality of  $\pi$  and a 2.5 page proof of the transcendence of  $\pi$ .

The modern proofs of Niven are understandable to students and teachers, thus making it not only possible but convenient to teach and learn this subject matter. We are the beneficiaries of the historical process. (Received September 22, 2011)