1080-03-362 **Laurel Marie MacMillan***, lmm8wc@virginia.edu. *Irrationality, Incommensurability, and a Paradigmatic Shift in Mathematics - Visualizing Plato's Forms.*

The discovery of irrational numbers or incommensurable lengths marked a turning point in Ancient Greek mathematical and philosophical thought. It marked a transition from the strict finitism of the Pythagoreans to the more expansive one that we eventually find in Euclid. It is widely believed that the first proofs of the existence of irrational numbers were geometric ones. I will show how these geometric proofs directly give the continued fraction representation of irrational numbers by way of the Euclidean algorithm. In ancient mathematics, these geometric constructions were seen to represent a new kind of mathematical object whose "number" is not directly observable yet whose reality could not be ignored. From our modern point view the geometric diagram or 'form' actually gives an algorithm to explicitly compute the continued fraction representation. This naturally leads to Plato's notion of form and explains the engraving on the academy door, "Let no one ignorant of geometry enter here." This view of Platonism corresponds to the one presented in W.W. Tait's *Truth and Proof: The Platonism of Mathematics*. I will give some examples so that we may actually *visualize Plato's forms* (Received January 31, 2012)