

**“LA CROIX DES MATHÉMATIENS”:  
THE EUCLIDEAN THEORY OF IRRATIONAL LINES**

BY WILBUR KNORR

For the modern reader Euclid's Tenth Book is by far the most intimidating portion of the *Elements*, by virtue of its enormous length and the obscurity of its techniques and motives. To approach this material, one requires a key, of the sort the Flemish mathematician-engineer Simon Stevin boasted to possess almost four centuries ago:

After we had viewed and reviewed the Tenth Book of Euclid treating of incommensurable magnitudes, and also had read and reread several commentators on the same, of whom some judged it for the most profound and incomprehensible matter of mathematics, others that these are most obscure propositions and the cross of mathematicians, and beyond this I persuaded myself (what folly doesn't opinion cause men to commit?) to understand this matter through its causes, and that there are in it none of the difficulties such as one commonly supposes, I have taken it upon myself to describe this treatise.<sup>1</sup>

Stevin's ploy, by which "this whole affair is easy and without difficulty", involved the expression of Euclid's propositions via a calculus of surd quantities, and more recent commentaries, such as those by Heath and by Junge, follow suit in the application of algebraic modes for explaining this material.<sup>2</sup> But for the historically minded reader the issue of interpretation has been complicated by this, for the originators of this theory cannot have had such algebraic modes at hand in their formulation. The project of elucidating the motives underlying Euclid's geometric form of the theory has largely eluded even the best of the modern accounts.<sup>3</sup>

I here propose to offer a view of the geometric problems on which the structure of Euclid's theory is built. This view fills out the details of a sketch I presented in my study of the pre-Euclidean geometry a few years ago and supplements the handy treatment given before that by B. L. van der Waerden.<sup>4</sup> I will show how the essential idea of the theory emerges through consideration

---

Received by the editors August 9, 1982.  
1980 *Mathematics Subject Classification*. Primary 01A20.