

# The Impact of the *Elements*

## The History of Mathematics, Part 8

Chuck Garner, Ph.D.

Department of Mathematics  
Rockdale Magnet School for Science and Technology

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# Outline

Impact

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Elements Through  
Time

Impact and  
Influence

Homework

**Elements Through Time**

**Impact and Influence**

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# The *Elements* Through Time

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- ▶ Additions to Euclid
  - Book XIV** Continuation of Book XIII  
(Hypsicles, c. 125 BC)
  - Book XV** Construction of solids  
(Isidorus, c. 525 AD)

(Removed from *Elements* in the 19th century)
- ▶ **The 888 AD edition of the *Elements*** ([link](#))
- ▶ First printed edition in 1482
- ▶ Other editions...

# 1482 Edition

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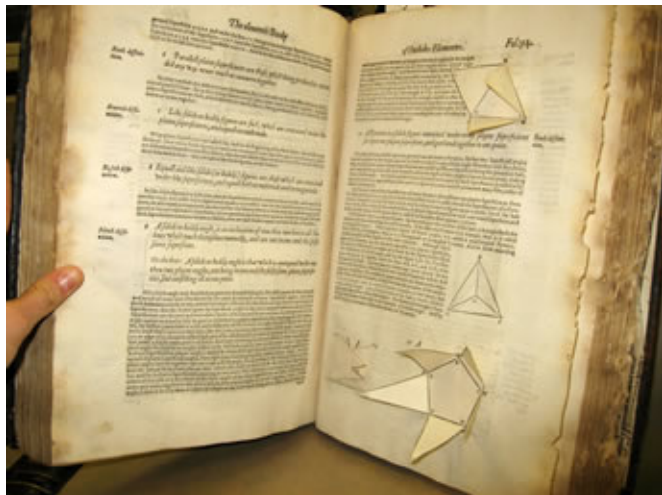
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First printed edition ([link](#))

# 1543 Edition



First “interactive” edition

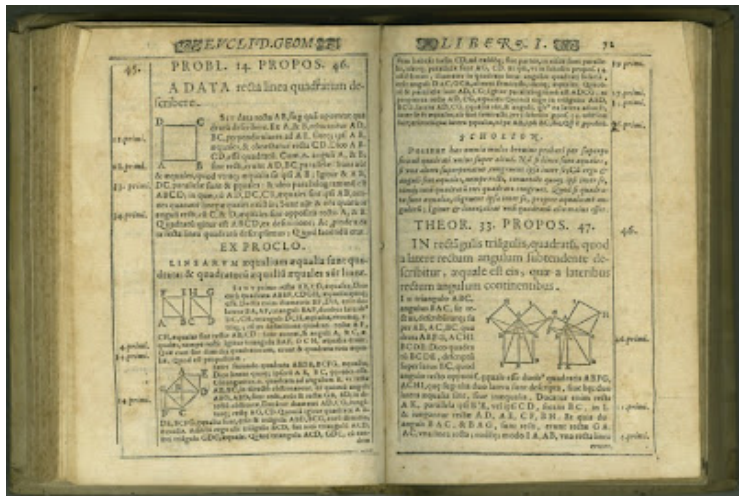
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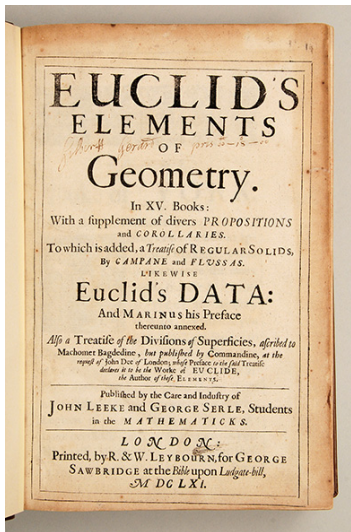
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Published by mathematician and astronomer Christopher Clavius

# 1661 Edition



First English edition; includes Euclid's *Data*

Impact

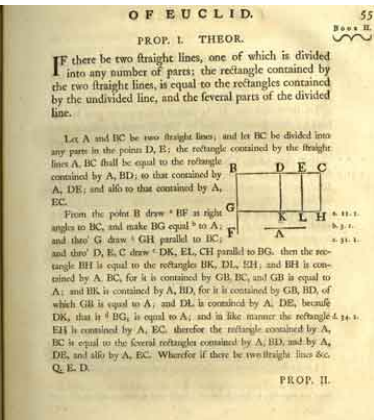
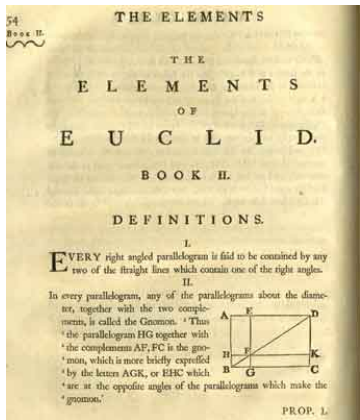
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Published in Glasgow by Foulis Press

# The *Elements* Through Time

- ▶ Byrne's 1847 color edition
- ▶ Heath's 1909 translation
- ▶ Green Lion Press edition
- ▶ **David Joyce's dynamic *Elements*** ([link](#))

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# Influence of the *Elements*

- ▶ Compass and straightedge are Euclidean tools
- ▶ Revolutionized mathematical thought
- ▶ Became a template for presenting mathematical thought
- ▶ Geometry became the standard notion of what mathematics is
- ▶ Arithmetic and algebra was for the common; geometry for the learned
- ▶ Geometry was the gateway to all other learning
- ▶ Influenced thinking for millenia
- ▶ Attempting to fix gaps in Euclid led to much more mathematics

# The Declaration of Independence

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We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.

# Abraham Lincoln and Euclid

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From Lincoln's law partner, Billy Henderson:

*He studied and nearly mastered the six books of Euclid since he was a member of Congress. He began a course of rigid mental discipline with the intent to improve his faculties, especially his powers of logic and language. Hence his fondness for Euclid, which he carried with him on the circuit till he could demonstrate with ease all the propositions in the six books; often studying far into the night, with a candle near his pillow, while his fellow-lawyers, half a dozen in a room, filled the air with interminable snoring.*

# Abraham Lincoln and Euclid

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Lincoln on why he studied Euclid:

*In the course of my law reading I constantly came upon the word “demonstrate”. I thought at first that I understood its meaning, but soon became satisfied that I did not. I said to myself, What do I do when I demonstrate more than when I reason or prove? How does demonstration differ from any other proof? ... I consulted all the dictionaries and books of reference I could find, but with no better results. You might as well have defined blue to a blind man.*

continued...

# Abraham Lincoln and Euclid

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Lincoln on why he studied Euclid:

*...At last I said,- Lincoln, you never can make a lawyer if you do not understand what demonstrate means; and I left my situation in Springfield, went home to my father's house, and stayed there till I could give any proposition in the six books of Euclid at sight. I then found out what demonstrate means, and went back to my law studies.*



# Abraham Lincoln and Euclid

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Lincoln, from the fourth Lincoln-Douglas debate:

*If you have ever studied geometry, you remember that by a course of reasoning, Euclid proves that all the angles in a triangle are equal to two right angles. Euclid has shown you how to work it out. Now, if you undertake to disprove that proposition, and to show that it is erroneous, would you prove it to be false by calling Euclid a liar?*

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# Homework

- ▶ More on the *Elements*  
*Math Through the Ages*, Sketch 14

Next: The Thinker and the Thug

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