
French Translations of Euclid's Elements in the first half of the 17th century

A Study of a Book in the Education Sphere

Slides!

Mia Joskowicz, Tel Aviv University



Presentation Roadmap

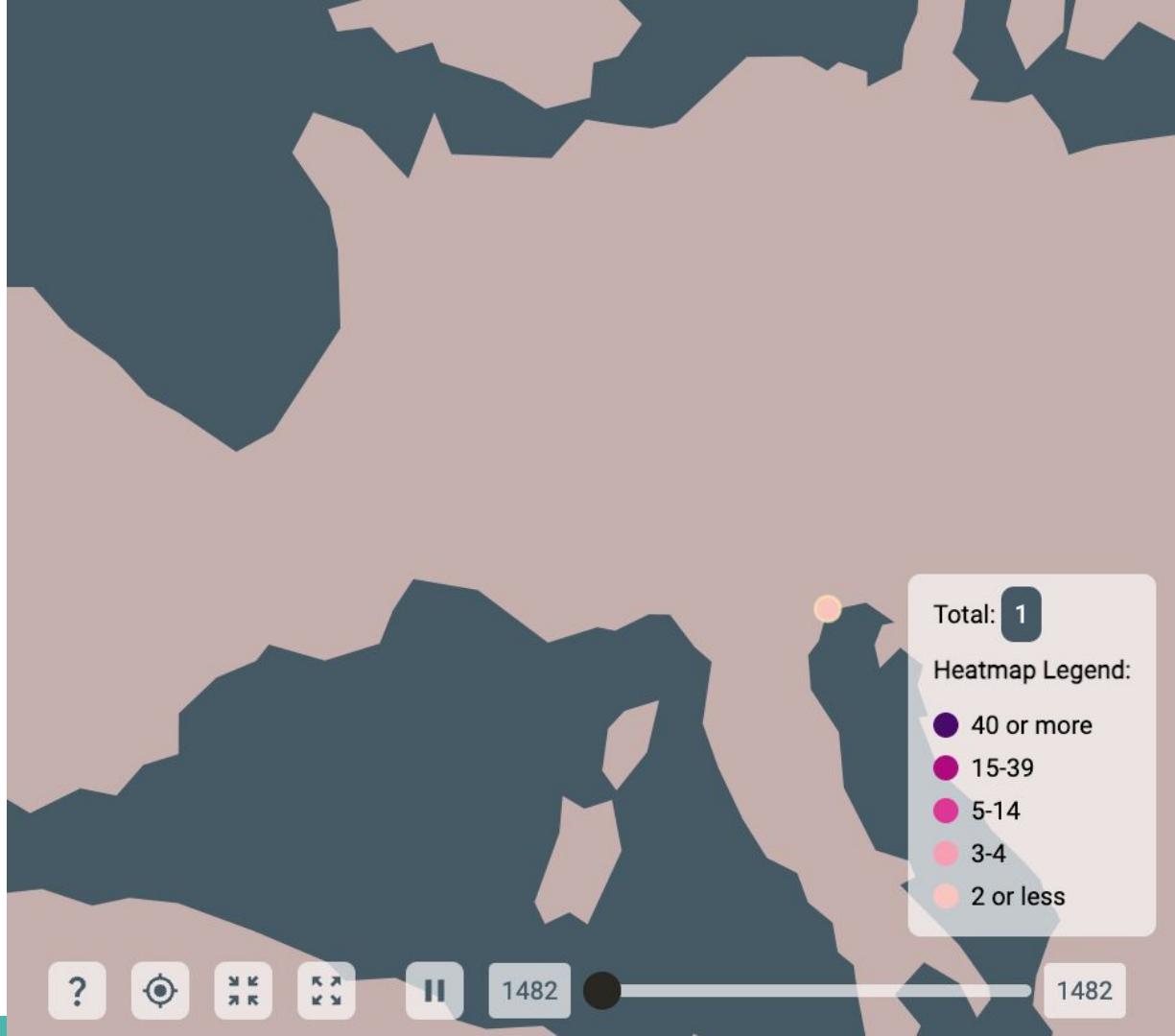
☞ Goal: Present my research to spark discussion.

- Motivation
 - ◆ Why are early 17th-century French translations of the Elements such a compelling case?
 - ◆ Why is an educational lens a valuable perspective?
- Guiding Questions and Provisional Assumptions
- What can applying an educational perspective entail?
 - ◆ Sub Qs
 - ◆ Methodological teasers and examples
 - ◆ Relation to high level scholarly trends

A Proliferation of Editions

* Based on Wardhaugh's 2020 catalog with adjustments.

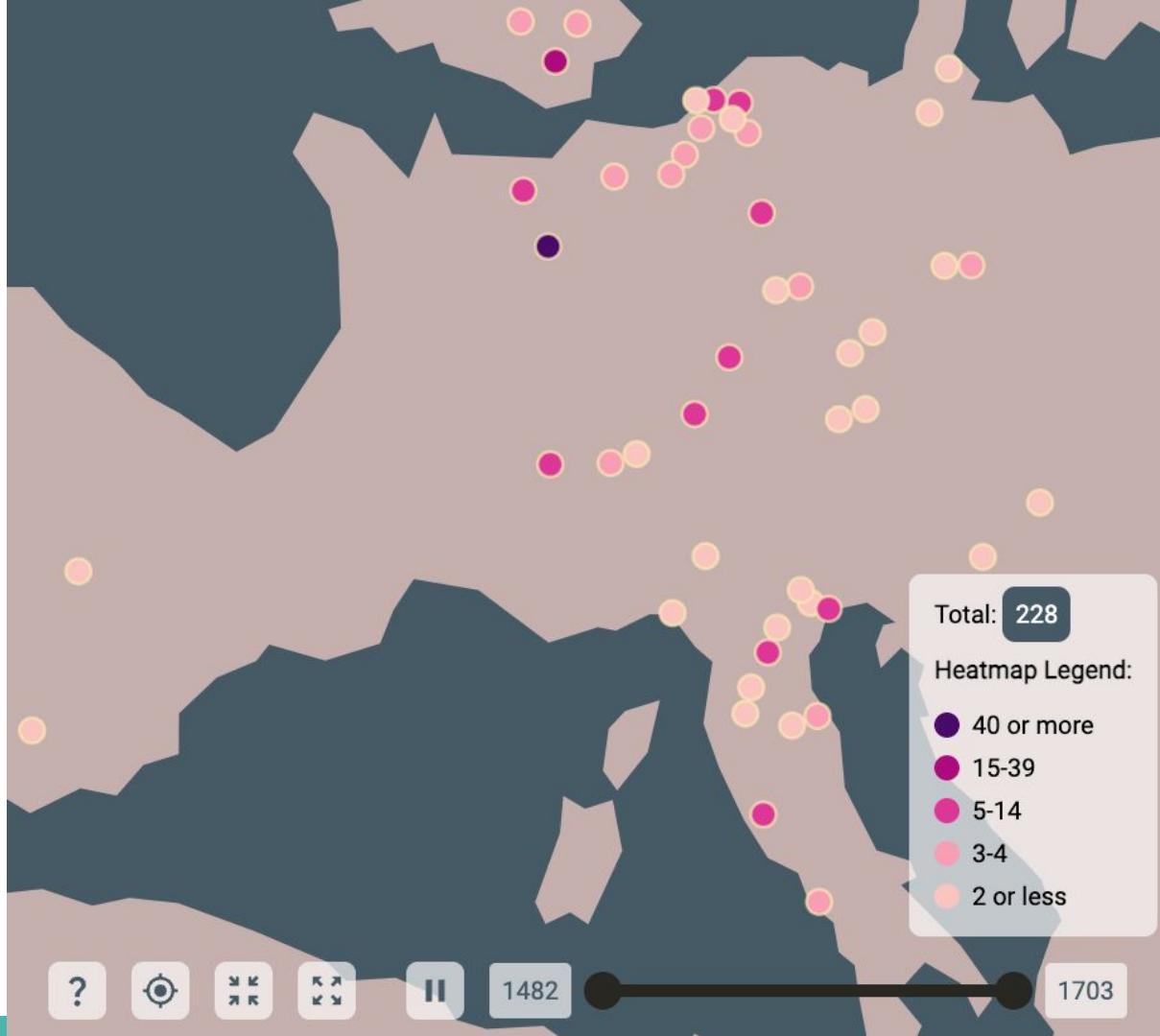
** Classification of translation vs. adaptation and additional editions not currently identified may affect map accuracy.



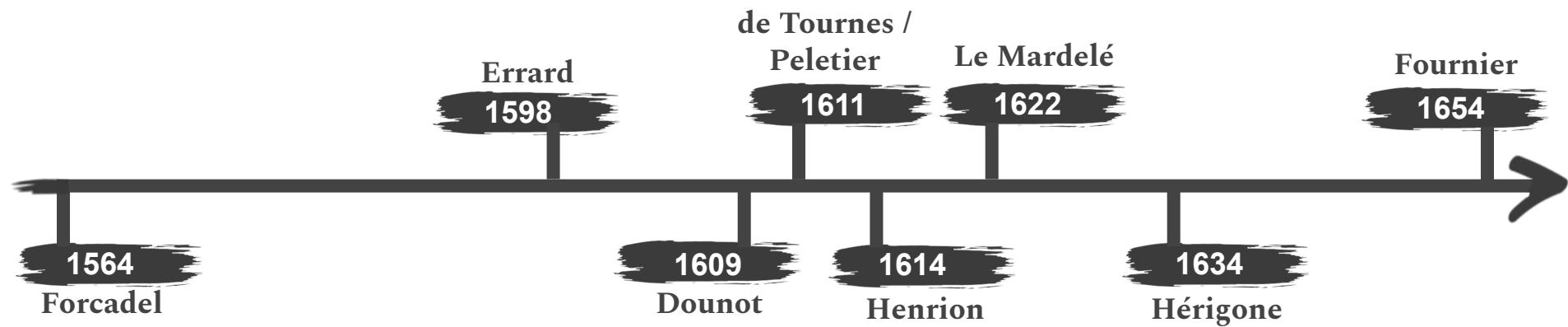
A Proliferation of Editions

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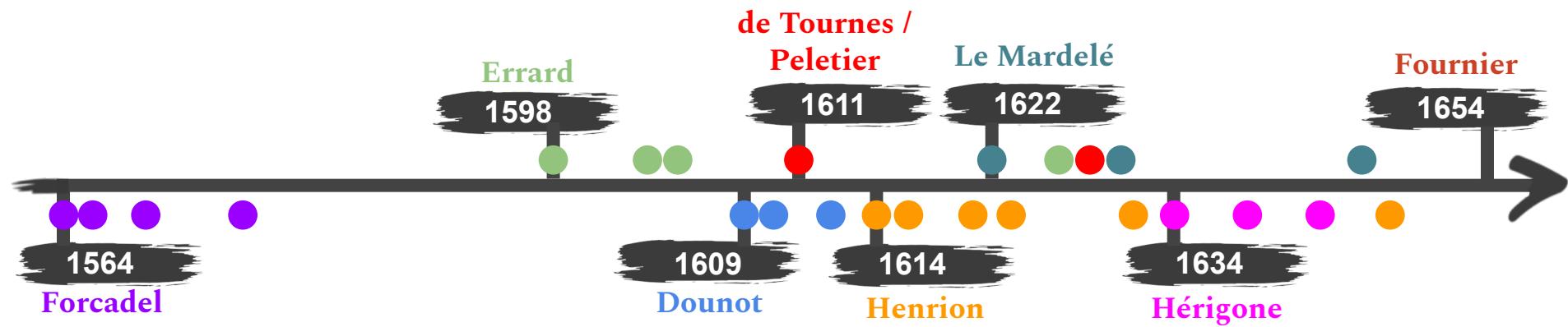
Printed French *Translations* of Euclid's Elements



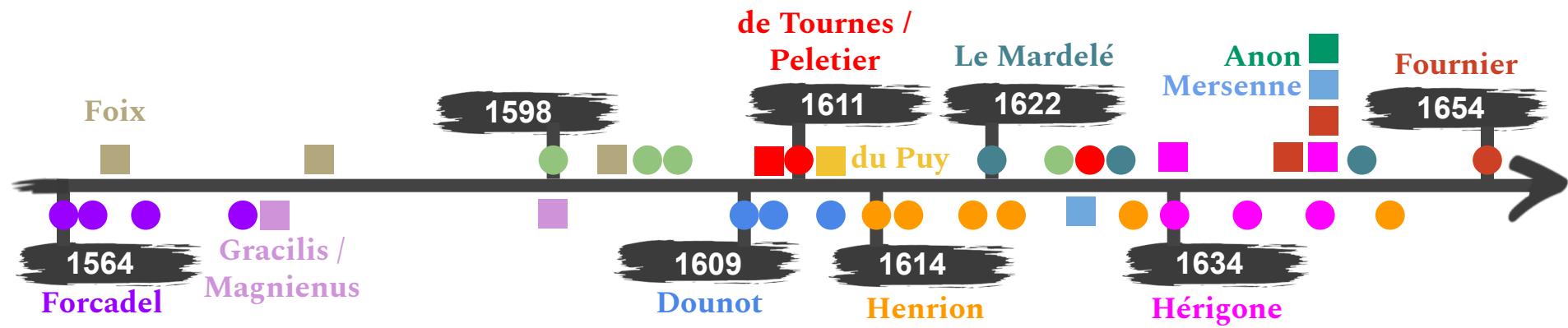
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Printed French *Editions* of Euclid's Elements



Printed French and Some Related Latin Editions of Euclid's Elements



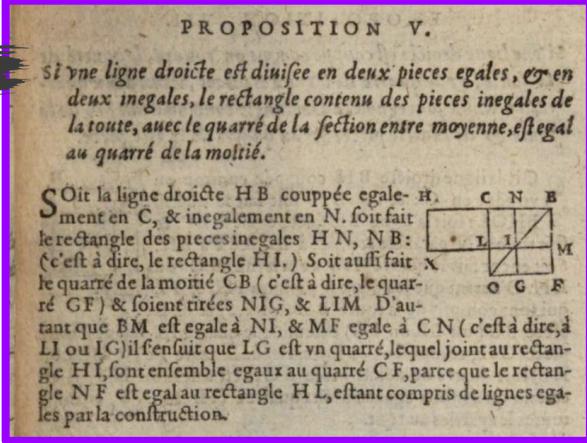
☞ Numerous Editions in a Short Timeframe and Restricted Geographic Area.

Zoom In: A Single Proposition

☞ The translations diverge noticeably.

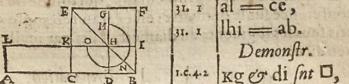
1564

Forcadel



THEOR. V. PROPOS. V.

Si vne ligne droïte est coupée en deux parties égales, & en deux parties inégales, le rectangle contenu des parties inégales de la toute, avec le quarre de la section entre moyenne, est égal au quarre de la moitié de la toute.



Hypoth.

ab est —,
ac z 2 cb,
ad z 2 db.

Req. à demonstr.
□adb → □cd z 2 □cb.

Preparation.
46. 1. cf est □ cb,
L.P. 1. cb est diamètre,
3. dg = bf uice,

31. 1. af = ce,
lhi = ab.

Demonstr.
kg est di sint □,
ak, ci, df sunt □;
hyp. ac z 2 cb,
z. f. 29. 1. mak z 2 ci,
not a df z 2 ci,
z. 4. 1. df z 2 mak,

□ch commun add.
□adb → □cd z 2 □cb.

19. 2. 1. gnom. kbg z 2 ah.
□cf z 2 { + □kg,

concl. □cf z 2 { ah,
a. 1. af □cf z 2 { kg □ cd.

G. iij

Si vne ligne droïte est coupée en deux parties égales, & en deux parties inégales, le rectangle contenu des parties inégales de la toute, avec le quarre de la partie du milieu, est égal au quarté de la moitié de la toute.

La ligne droïte AB , soit diuisée au point C , en 2 parties égales, & en 2 parties inégales au point D . Il dis que le rectangle contenu sous AD , & DB , parties inégales de la toute AB , avec le quarté de la partie du milieu CD , est égal au quarté de CB , moitié de la toute AB .



Cat soit deçue CF , quarre ° de CB , & soit o 46. 1. mené le diamètre BE , & par le point D , soit mené p DG , parallele à FE , ou CE , coupant le diamètre au point H , & par le point H , soit mené IK , parallele à AB , & du point A , mené AL ,

Fournier

1654

1634

Hérigone

Why? Read in Context!

The proliferation of editions along with the variations they display in multiple dimensions



What does each translation contribute that is absent from other French versions and from the larger body of mathematical texts at the time?

What gaps, or lacunae, do these translations address?

These gaps may not be purely **mathematical**; they could be **social, political, religious, cultural, cognitive, philosophical, etc.**

The answers to these questions vary widely, reflecting different motivations and valid contexts.

Which context?

Among various possible contexts, the **educational** context emerges as **justified** and **promising**.



Euclid(?) in 'The School of Athens', Raphael, c.1509–11

Didactic comment in Proposition V, Book I, Hérigone, 1639

THEOR. II. PROPOS. V.

Des triangles isosceles, les angles qui sont à la base, sont égaux entr'eux : Et les lignes droites égales estans prolongées, les angles qui sont sous la base, seront égaux entr'eux.

Les démonstrations de ceste proposition, & des deux suivantes, sont des plus difficiles, pour ceux qui commencent : Mais si pour la première fois on se contente d'apprendre seulement le sens, on pourra entendre facilement les démonstrations, apres qu'on aura appris celles des autres propositions du premier livre.

Hypoth. au Δabc | $ab = ac$,
 $abd \angle = ace \angle$ —

The next section will clarify it by exploring what an educational perspective can entail.

Guiding Questions

1. *What does each translation add in terms of mathematical content?*
2. *How do these translations aim to teach and present the mathematical content of the Elements?*
3. *What social conditions prompted the production and reception of each translation?*

Provisional Assumptions & Hypotheses

- The social, educational, and mathematical dimensions are *deeply interconnected*.
- The varied educational environments played a significant role in shaping which mathematical ideas were explored and how they were explored, balancing both social and mathematical considerations.
- The Elements served as a focal point where ideas were transformed, explored, repurposed, set aside or resurfaced in different forms and directions.

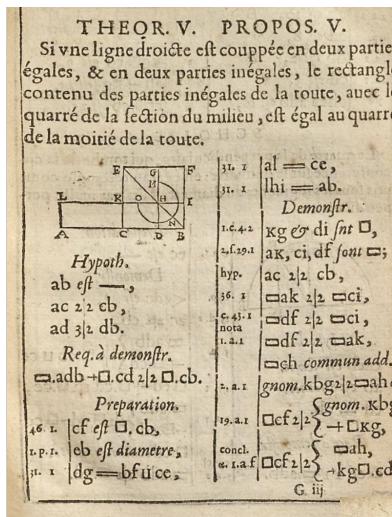
These interconnected questions require an approach that considers them together rather than in isolation.



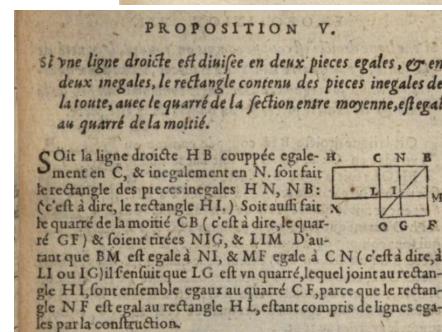
The following slides will outline some methods guided by this integrated approach.

Adopting an Educational Perspective: The Mathematical *Content*

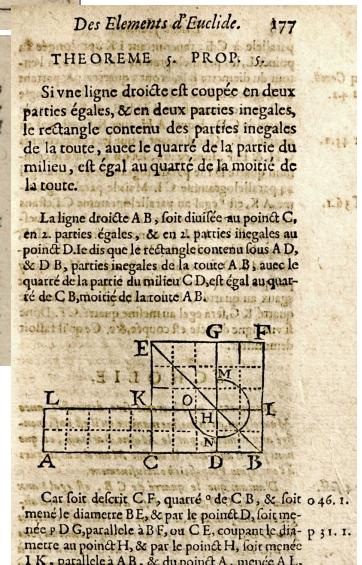
- Which mathematical conceptions were introduced in each translation?
 - Which aspects of the mathematical content were adaptable or flexible, and which remained stable throughout the translations and related literature?
 - Which changes were explicit, and which were implicit?

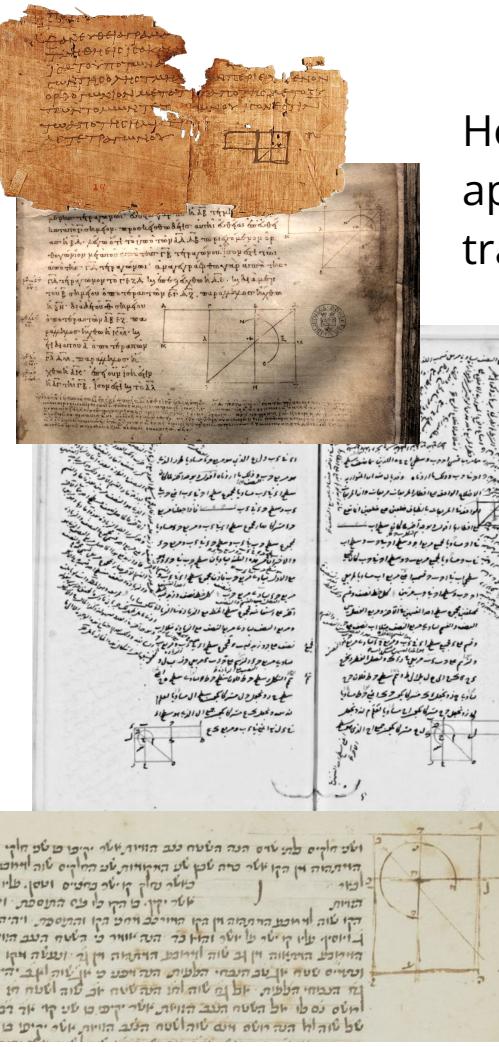


*Proposition V, Book II,
Fournier, 1654*



*Proposition V, Book II,
Forcadel, 1564*





How do traditional and innovative approaches manifest in the translations?

In what ways do they align with, challenge, or expand upon the
Euclidean tradition?

THEOR. V. PROPOS. V.

Si vne ligne droite est coupée en deux parties égales, & en deux parties inégales, le rectangle contenu des parties inégales de la route, avec le carré de la section du milieu, est égal au quarté de la moitié de la toute.

Hypoth.
ab est —,
ac \geq cb,
ad \leq db.

Req. à demonstr.
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ak, ci, df sont □;
hyp.
36. i. mak \geq cci,
c. 43. i. mdf \geq cci,
not a. 2. odf \geq mak,
odf \geq mak add.
2. a. 1. gnom. kbg \geq ah,
odf \geq kg. Sgnom. kbg
19. a. 1. odf \geq kg, — + kg
concl. odf \geq kg, — + kg \geq cd.
G. ii.

BOOK II. PROP. V. PROB.

F a straight line be divided into two unequal parts, the rectangle contained by the unequal parts, together with the square of the line between the points of section, is equal to the square of half that line

PROPOSITION V.

Si vne ligne droite est diuisee en deux pieces égales, & en deux inégales, le rectangle contenu des pieces inégales de la toute, avec le quarté de la section entre moyenne, est égal au quarté de la moitié de la toute.

THEOREME 5. PROP. 5.

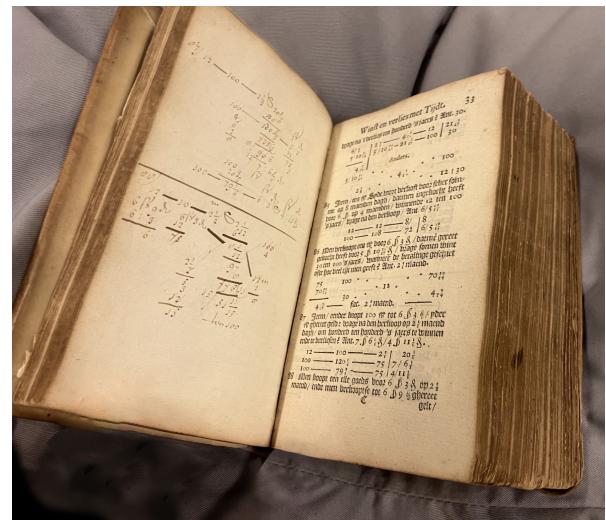
Si vne ligne droite est coupée en deux parties égales, & en deux parties inégales, le rectangle contenu des parties inégales de la route, avec le quarté de la partie de la moitié de la toute, est égal au quarté de la moitié de la toute.

Soit la ligne droite H B, coupée égale-
ment en C, & inégalement en N, soit fait le rectangle des pieces inégales H N, N B: ce est à dire, le rectangle H L I. Soit aussi fait x le quarté de la moitié CB (c'est à dire, le carré GF) & soient tirées NIG, & LIM. D'autant que BM est égale à NI, & MF égale à CN (c'est à dire, à LI ou IC) il s'en suit que LG est un quarté, lequel joint au rectangle H L I, font ensemble égaux au carré C F, parce que le rectangle N F est égal au rectangle H L, étant compris des lignes égales par la construction.

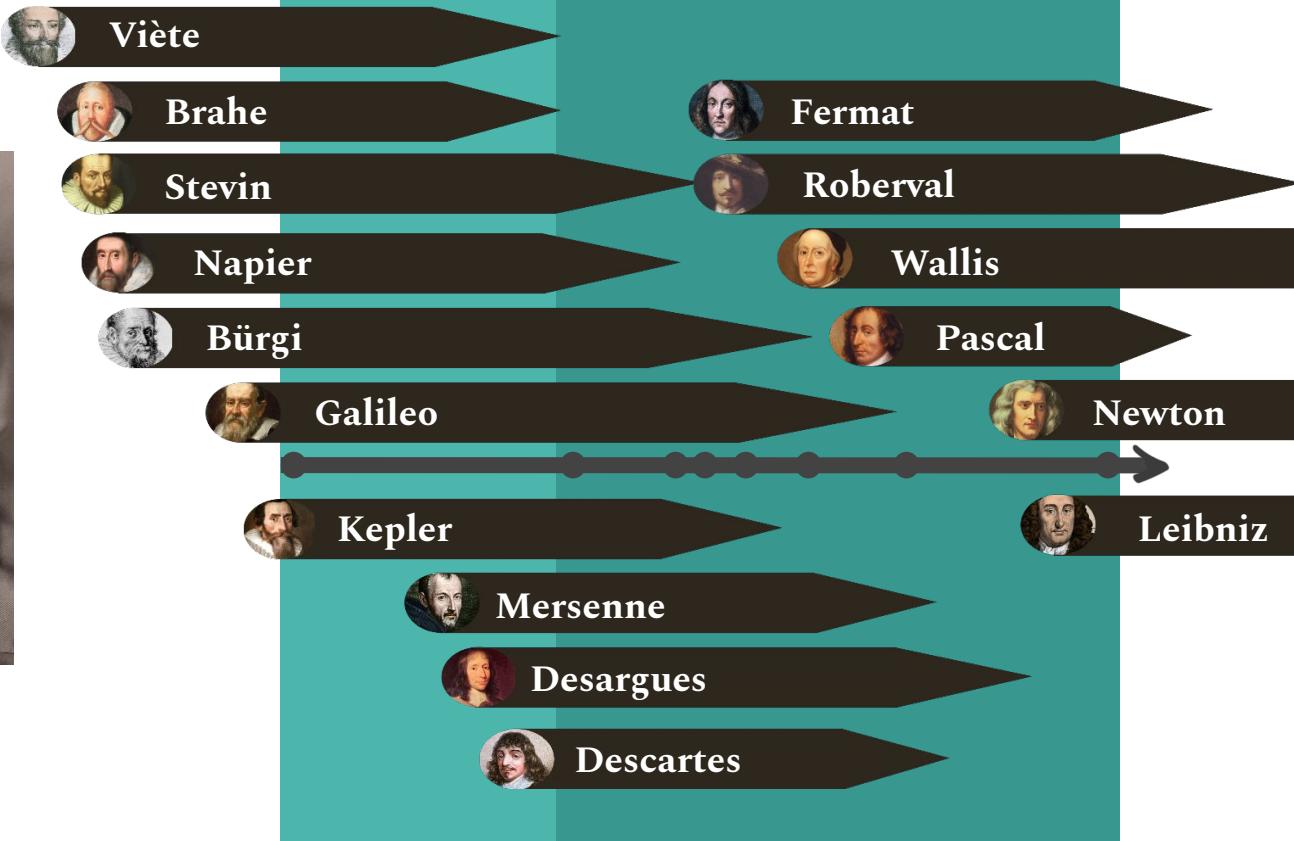
Des Elements d'Euclide. 177

Est une ligne droite AB, soit diuisee au point C, en 2 parties égales, & en 2 parties inégales au point D. Soit que le rectangle contenu sous AD, & DB, parties inégales de la toute AB, soit égal au quarté de la partie du milieu CD, soit égal au quarté de CB, moitié de la toute AB.

Car soit decrit C P, quarté de C B, & soit o 46. i. mené le diamètre B E, & par le point D, soit menée G, parallèle à B E, ou C E, couplant le diamètre au point H, & par le point H, soit menée I K, parallèle à A B, & du point A, menée A L,



Interleaved notebook bound with an Arithmetic textbook, 1676.



How do the translation engage with both **contemporary** and earlier mathematical concepts, practices and approaches?



Educating the Professionals

d'une forme en autre : & généralement de tout ce
que vousavez trouvé en la Geometrie estre nécessaire &
propre pour l'art militaire , soit pour fortifications , soit
pour placer armées , les ranger , exercer , & s'en servir
commodelement . Ce n'est donc pas sans raison , que je vous

the need for accessible educational

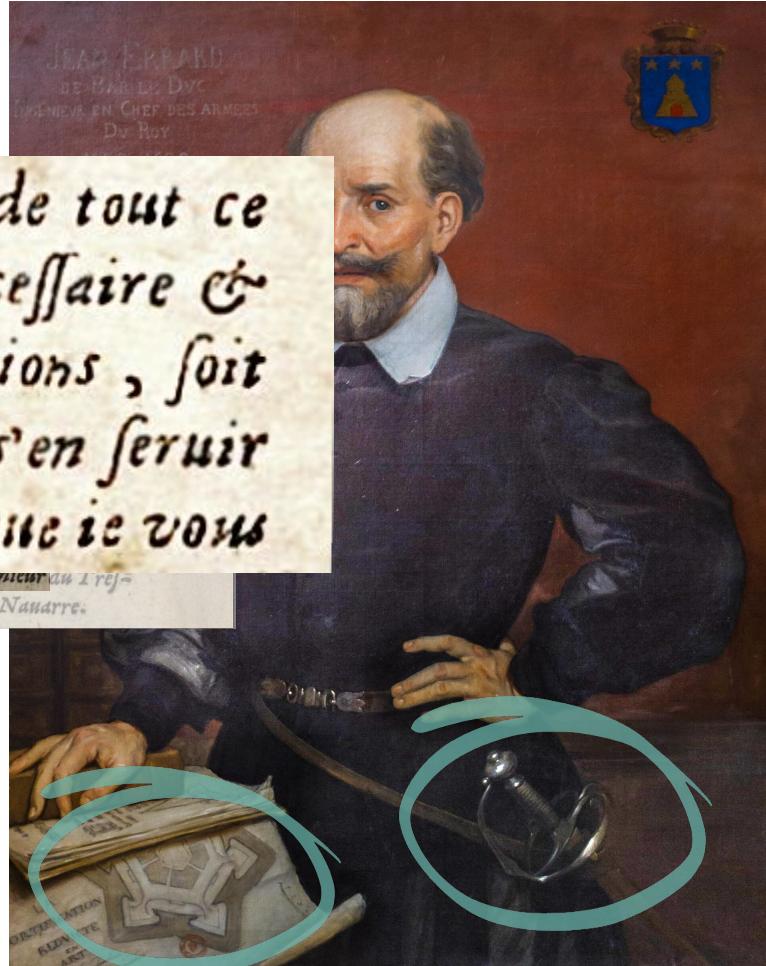
books suited to artisans, craftsmen and
merchants.

A L'ISLE A R D de Daricqanc, Engagé au Tref-
chrestien ROY de France & de Navarre.

Title Page, Errard, 1605.

dition d'une forme en autre : & généralement de tout ce
que vousavez trouvé en la Geometrie estre nécessaire &
propre pour l'art militaire , soit pour fortifications , soit
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À la noblesse françoise, de Tournes, 1628

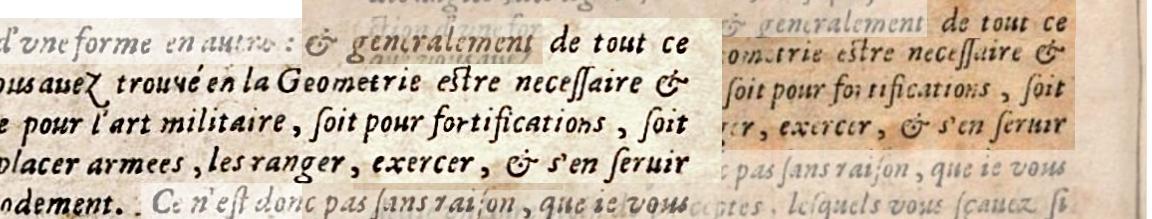


Portrait de Jean Errard, a military engineer and a translator of the Elements, pointing to a fortification figure

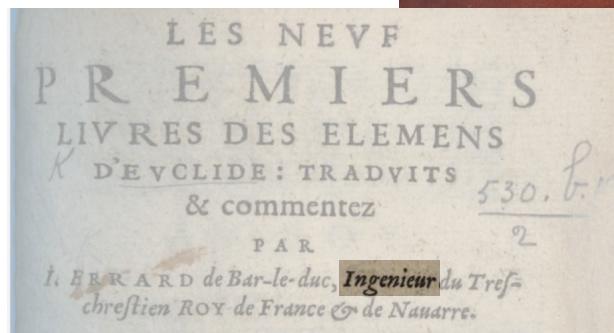


Educating the Professionals

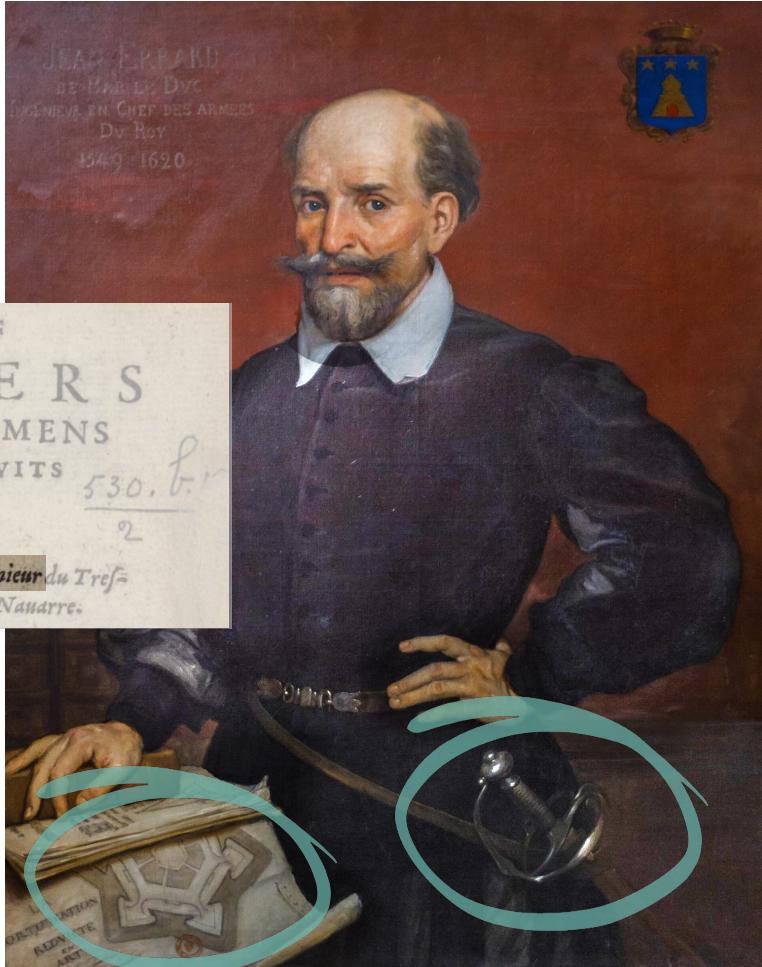
The growing professionalization of fields like engineering, military science, navigation and surveying created an increasing demand for practical mathematical knowledge, likely driving the need for accessible educational books suited to artisans, craftsmen and merchants.



A la noblesse françoise, de Tournes, 1628



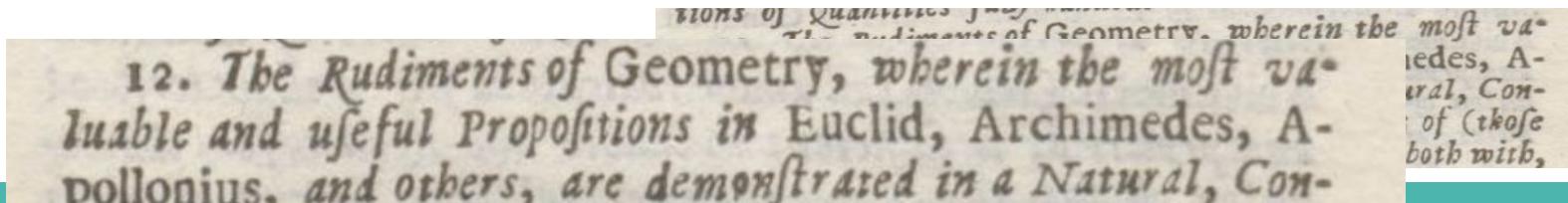
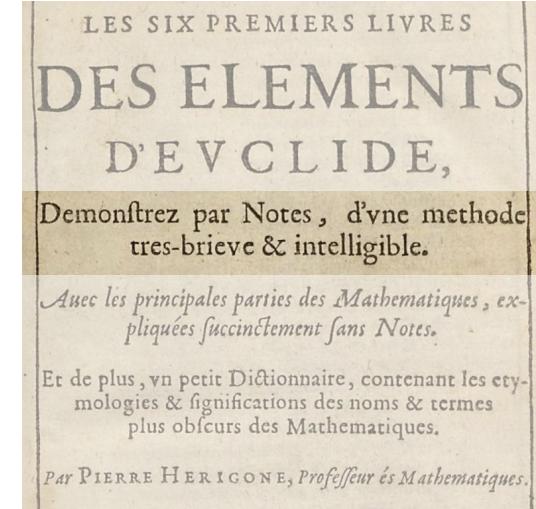
Title Page, Errard, 1605.



Portrait de Jean Errard, a military engineer and a translator of the Elements, pointing to a fortification figure

Adopting an Educational Perspective: How the Elements Were Presented and Instructed

- **Didactic Strategies:** Might reflect broader approaches and intellectual movements, such as humanism and the Reformation.
- **Educational Objectives:** E.g., emphasis on rigor, practical applicability, and/or clarity.
- **As Part of the Instruction Tradition:** Tracing innovations and traditional methods across translations.
- **Position Among Textbooks, Manuals and Treatises:** Highlights the alignment of the translations' approaches among broader educational resources.
- **Audience Focus:** Techniques variation based on intended audiences.



How Can We Examine the How? Layout, Style, Structure and Language

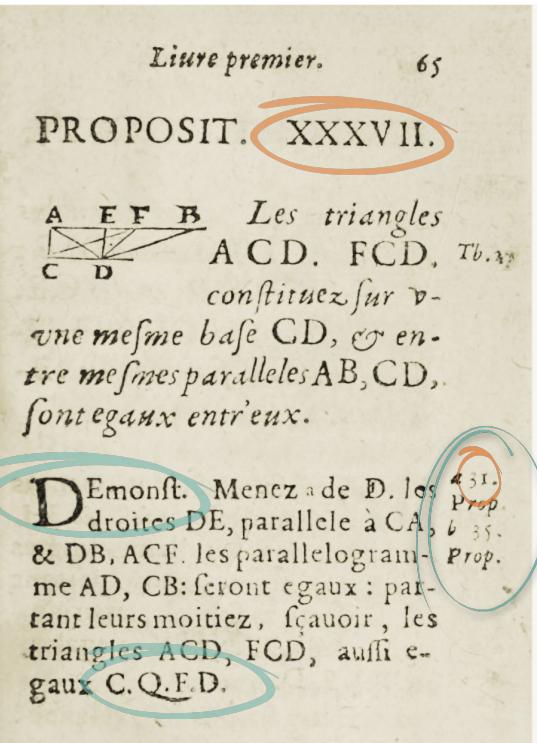
- Used to convey educational objectives and priorities, such as demonstration rigor, practical use, and clarity.
- Differentiates and marks the roles of various components (e.g., enunciations, demonstrations).
- Helps to classify and connect these works with other contemporary publications, noting similar or differing structures.

Roman numerals are used in headings;
Hindu-Arabic numerals are used within the body.

MAJUSCULE
ROMAN

Italics

Roman

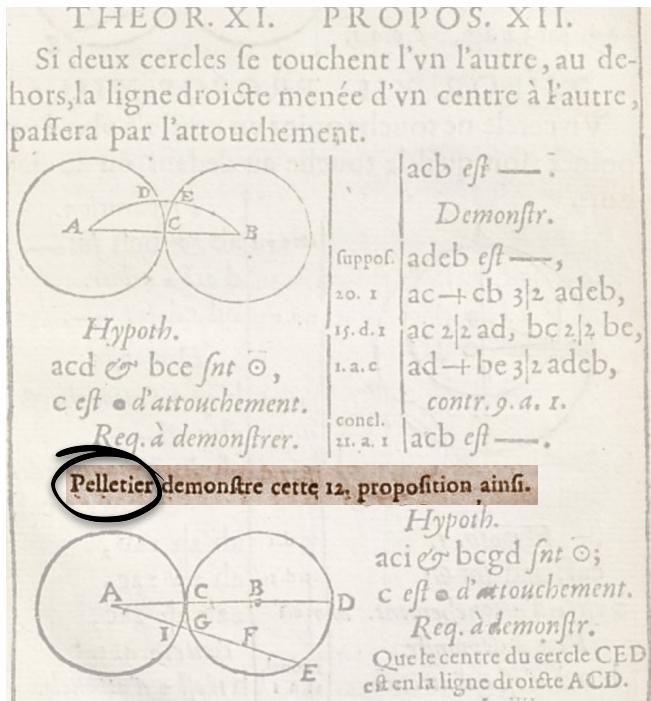


Terms like "Demonst." and "C.Q.F.D.," and the type **signal** the structure of the demonstration.

Adopting an Educational Perspective: French-Speaking Early 17th Century Education Landscape

- Shifting roles and dynamics between universities and colleges
- Influence of Jesuit instruction
- A curriculum blending scholastic and humanist traditions
- Expanded readership, including navigators, engineers and merchants among others, whose professions increasingly demanded some mathematical expertise.
- Print as a source of new challenges and opportunities
- Religious climate marked by tension, unrest and conflict
- Latin vs. French and vernaculars shifts
- A vibrant mathematical environment, including new innovations and vital communication

The Relationships Between the People Behind the Pages



Reformulating Peletier alternative demonstration to Proposition XII, Book III. Hérigone, 1639.

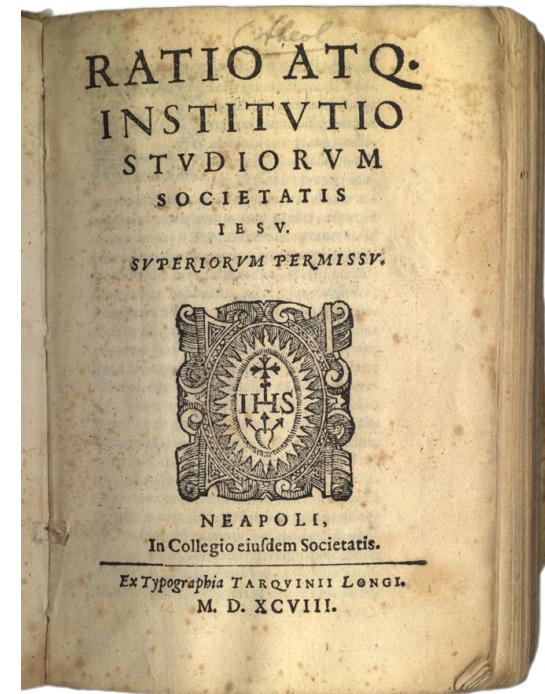
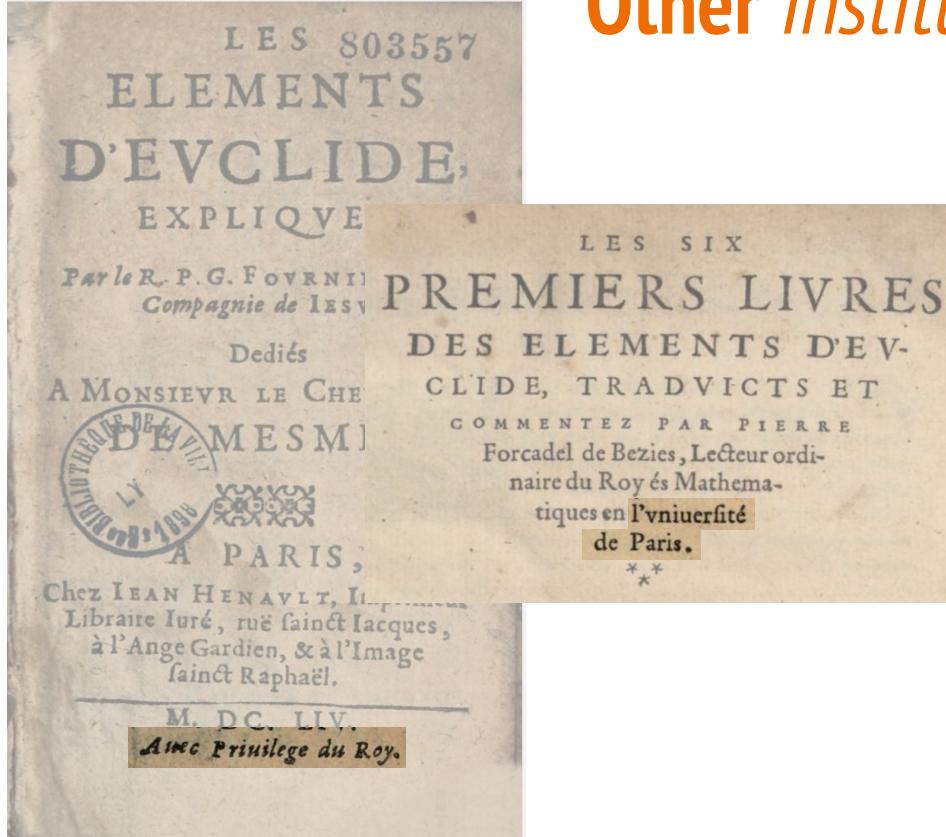
Who were the main contributors to these translations?
Authors, educators, printers, publishers, etc.

How did their professional ties, backgrounds, and networks shaped the translation?

présenté. Au demeurant ie scay que Forcadel & Errard ont fait voir aux François l'Euclide, ou partie d'icelluy: mais cela ne m'a pas empêché de traduire & imprimer Peletier, pour la singuliere methode & merveilleuse facilité qui lui est familiere. Ce que ie ne commence pas maintenant acognostre, luyant appris & remarqué dès l'age de quatorze ans, lors que ledit Peletier me lisoit, en la maison de mon pere, les Demonstrations de Theon & de Champagne sur ces six premiers liures. Mais, Illustres &

References to Previous translations of the Elements, À la noblesse françoise. de Tournes, 1628.

Considering Educational, Print, and Other Institutions



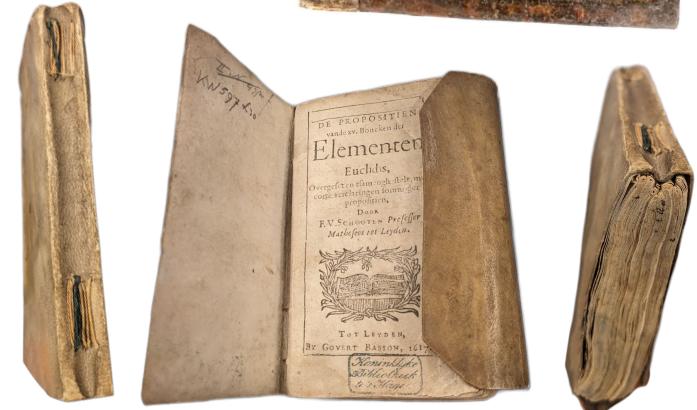
Ratio atque Institutio Studiorum Societatis Iesu,
1598

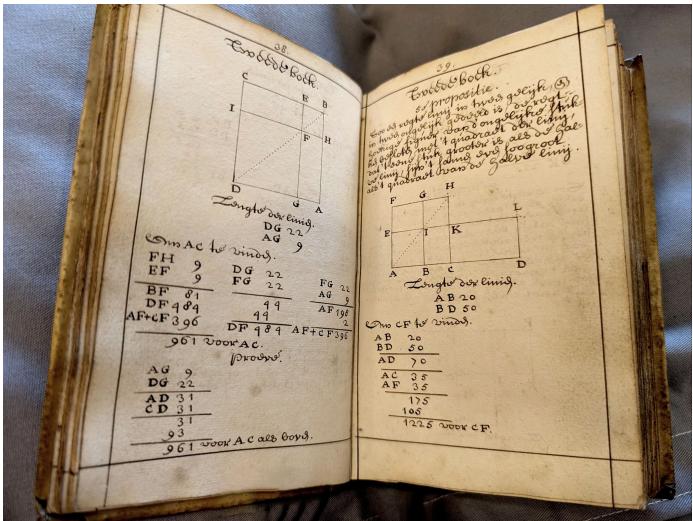
*Partly restored contemporary
binding, in-folio Latin translation,
d'Étapes, 1516*

The Material Dimension

- The book's size, format, and binding reveal much about presentation, intended audience, readership and more.
- These aspects relate to both the *how* of the instruction, but also give us a glimpse into the *who*: the various people involved in the book's production, dissemination and conception.

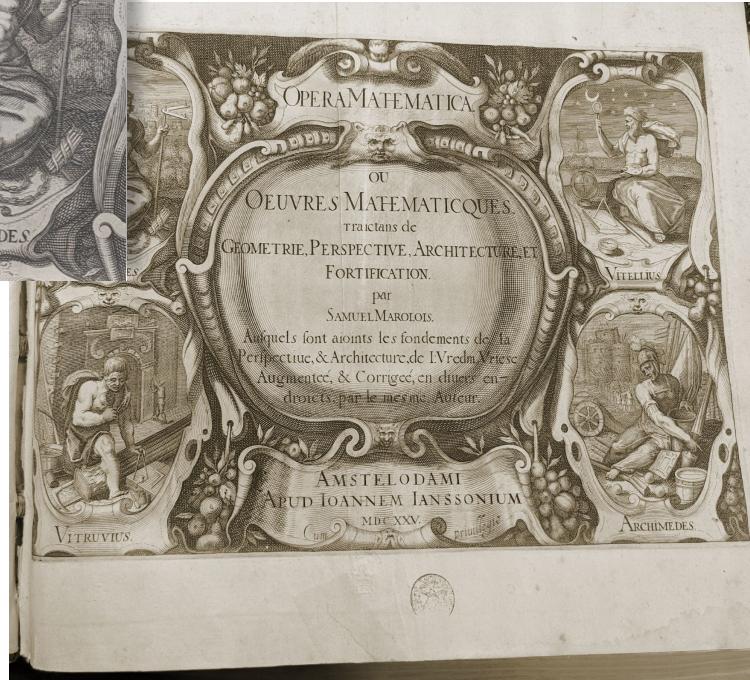
*Long-stitch binding, in-12 Dutch
translation, Van Schooten, 1617*





Acknowledging the
Continued Relevance of
Manuscript Materials

Thinking About Euclid as a Hallmark



Following Recent Developments: The Divide Between External and Internal History of Mathematics

- In recent years, the socio-cultural perspective became more prominent in the history of mathematics.
- These works do not construct an externalist social history of mathematics.
- Multiple researchers in the past few decades successfully transcended the traditional dichotomy between internalist and externalist history of an intellectual discipline, weaving the technical and socio-cultural aspects together.

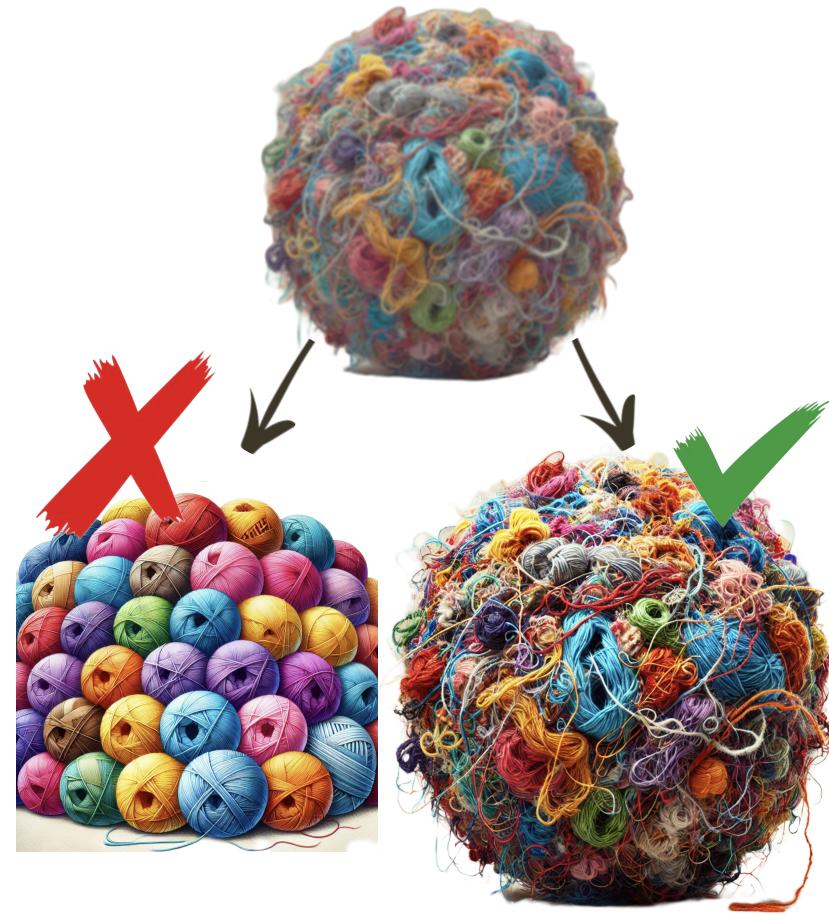
Following Recent Developments: Early Modern Education Books

- Educational studies often focus on *textbooks* as a source for understanding how knowledge is structured and transmitted across generations
- *Textbooks* are often viewed as works authored by contemporaries and designed to offer a condensed and elementary introduction to a subject in a simplistic style for students, sometimes mitigating the “original”, frequently classical, texts.
- In what senses the vernacular Elements can indeed be analyzed as a textbook? An educational Book? In what senses does it differ?

What do I Try to Do?

Present the mathematical landscape as a “beautiful mess”—a set of complex, non-linear interactions of ideas, individuals and groups that converged in a few key sites, one of which was the educational sphere, particularly through the medium of the Euclidean text.

Fill in details, **clarify** the intricate links, **without untangling** them.



Numerous and Varied French Translations from the First Half of the 17th Century

Why?

Read in context

Which?

Educational

How can we adopt this lens?

Guiding Qs

1. What content changed? Adaptability vs. Stability.
2. How was it taught and presented?
3. What social conditions prompted the variety?

How can we approach these Qs?

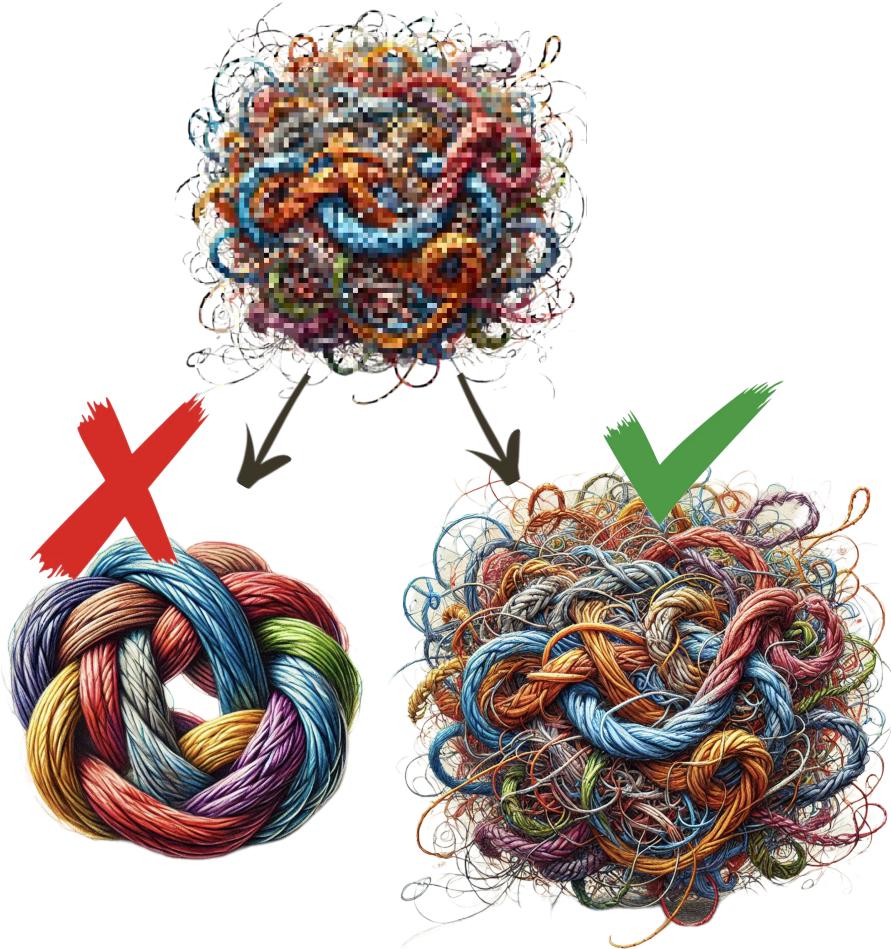
- Sub Qs
- Methodology teasers
- Recent scholarly development

Connecting the Threads: A Recap

Guiding Perspective

Present the mathematical landscape as a “beautiful mess”—a set of complex, non-linear interactions of ideas, individuals and groups that converged in a few key sites, one of which was the educational sphere, particularly through the medium of the Euclidean text.

Fill in details, clarify the intricate links, without untangling them.



Connecting the Threads: Weaving the Future

Present the mathematical landscape as a “beautiful mess”—a set of complex, non-linear interactions of ideas, individuals and groups that converged in a few key sites, one of which was the educational sphere, particularly through the medium of the Euclidean text.

Fill in details, **clarify** the intricate links, **without untangling** them.

Thank you!



Mia Joskowicz

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