

Russian translation of Euclid's Elements by Suvorov and Nikitin (1784)

and the teaching of elementary geometry in Imperial Russia
(1721-1917)

Andrei Rodin

SPHERE/Paris-Cité

12 September 2026

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Before 1700

Separate mathematical MSS, no printed mathematical books, no continuing mathematical school.

Before 1700

Two major scholarly centres existing by 1700:

Before 1700

Two major scholarly centres existing by 1700:

- Academia Kiioviensis Mohileana (Киево-Могилянская академия): Kiev, 1631–1817 A significant evidence of mathematical activity after 1700.

Before 1700

Two major scholarly centres existing by 1700:

- Academia Kiioviensis Mohileana (Киево-Могилянская академия): Kiev, 1631–1817 A significant evidence of mathematical activity after 1700.

In 1991 the Academy has been re-established in its historical premises but the continued identity of the institution remains controversial.

Before 1700

Two major scholarly centres existing by 1700:

- Academia Kiioviensis Mohileana (Киево-Могилянская академия): Kiev, 1631–1817 A significant evidence of mathematical activity after 1700.
In 1991 the Academy has been re-established in its historical premises but the continued identity of the institution remains controversial.
- Academia Slavo-Graeco-Latina (Славяно-греко-латинская академия): Moscow, 1687–1814.
No direct evidence of mathematical activity.

1701: foundation of Moscow School of Mathematics and Navigation (Школа математических и навигацких наук) by Peter I

The original team professors comprised 8 people, 4 British and 4 Russians, including Leonty Filippovich Magnitsky (Леонтий Филиппович Магницкий), born Telyatin (Телятин)(1669–1739). The School existed until 1753.

1724: foundation of Russian (Saint Petersburg) Academy of Sciences (and Arts) by Peter I

First invited members were exclusively foreigners and included names who later became prominent: Leonhard Euler, Christian Goldbach, Nicolas, and Daniel Bernoulli.

The first Russian member of RAS, Mikhail Lomonosov, joins the Academy in 1740 (after graduating from SGLA and studying in Marburg and Freiburg universities).

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Leonty F. Magnitski (Леонтий Федорович Магницкий)

Leonty was born into a peasant family in Ostashkov, Tver region, served in a local monastery and around 1683-85 moved in Moscow where he worked as a private tutor in powerful families. Through these social connections he eventually met Peter (plausibly in 1698, the event is not documented), who invited him to serve as a professor in the newly founded School of Mathematics and Navigation.

Leonty F. Magnitski (Леонтий Федорович Магницкий)

Leonty was born into a peasant family in Ostashkov, Tver region, served in a local monastery and around 1683-85 moved in Moscow where he worked as a private tutor in powerful families. Through these social connections he eventually met Peter (plausibly in 1698, the event is not documented), who invited him to serve as a professor in the newly founded School of Mathematics and Navigation.

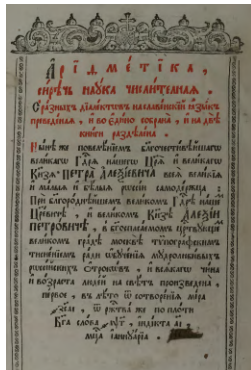
Leonty F. Magnitski (Леонтий Федорович Магницкий)

Leonty was born into a peasant family in Ostashkov, Tver region, served in a local monastery and around 1683-85 moved in Moscow where he worked as a private tutor in powerful families. Through these social connections he eventually met Peter (plausibly in 1698, the event is not documented), who invited him to serve as a professor in the newly founded School of Mathematics and Navigation.

The name “Magnitsky” was given to Leonty by Peter and was supposed to tell that the man had somewhat *magnetic* spirit.

Arithmetic by Leonty Magnitski

Composed in Russian/Church Slavonic by order of Peter; published in 1703 in Amsterdam by Yan Tessing in 2400 copies (!). Served as the basic mathematics textbook in the Russian Kingdom/Empire until c. 1750.



Magnitski's sources (after A.P. Yushkevich)

Jacob van der Schuere, *Arithmetica*, Haarlem 1601, *Arithmetica oft Reken-Konst*, Amsterdam 1643

Johanne Faulhaber, *Arithmetischer Wegweiser zu der hochnutzlichen freyen Rechenkunst*, Ulm 1614

André Taquet, *Arithmeticae Theoria et Praxis*, Lovani, 1656

Joannes Stanislaus Formankowic, *Arithmetica practica bipartita generalis. Nimirum et specialis conscripta*. Cracoviae 1669

John Wallis, *Operum Mathematicorum Pars Prima* (including a chapter on *Mathesis Universalis*) , Oxonii 1657

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Semen Mordvinov (Семен Иванович Мордвинов) (1701–1777)

Gaduate of *Naval Academy* , which was a military school in Saint-Petersburg founded by Peter in 1715; in 1752 it was reorganised and renamed as *Naval Cadets Corps* which existed through the 19th century (and by some accounts still perdures under a different name). Career Naval officer; since 1764 an Admiral of the Russian Navy.

The author of four-volumed *Complete Collection on Navigation* (Полное собрание о навигации) published during the period 1748–1753. The first volume of this collection is an Elementary Geometry textbook supplemented with chapters treating the Trigonometry. In 1753 Mordvinov's *Interpretation of Geometry* (Толкование геометрии) was distributed as a manuscript.

Collection on Navigation, vol. 1 (1748)



As severe winds blow, the seafarers with God fight against them

They rarely can see the shores.

But their ways are protected with that Science

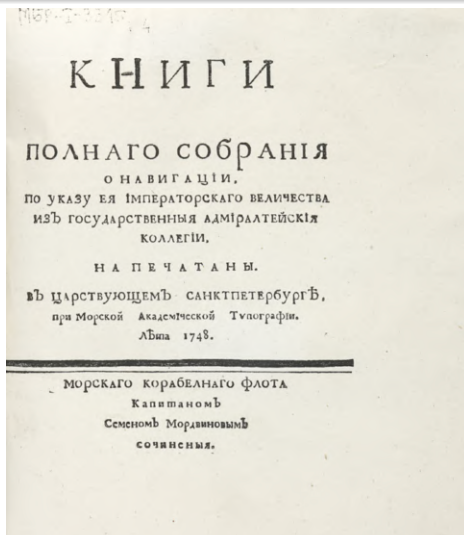
That allows them to know places both on the Land and the Sea

And to reach the wanted harbours.

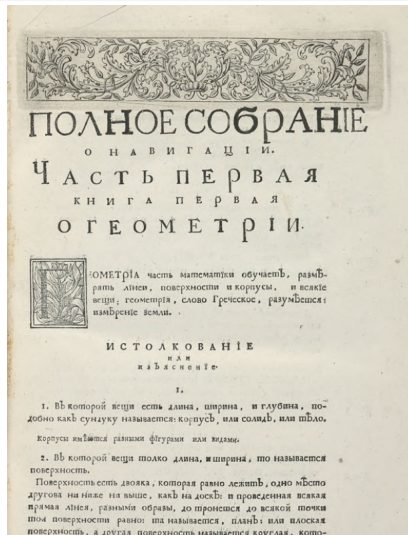
Collection on Navigation, vol. 1 (1748)



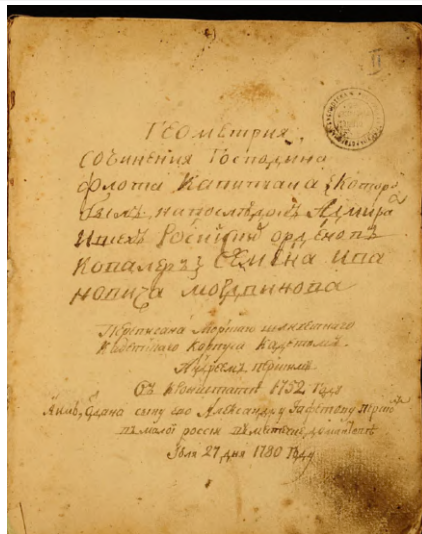
Collection on Navigation, vol. 1 (1748)



Collection on Navigation, vol. 1 (1748)



Geometry 1752



[illegible]

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Nikolai Gavrilovich Kurganov (Николай Гаврилович Курганов)(1726-1796)

Graduate of the Moscow School of Mathematical Sciences and later of Saint-Petersburg Naval Academy founded in 1715.

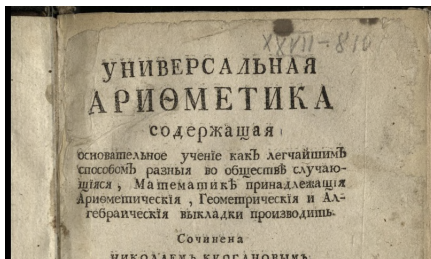
Student of and later assistant to L.F. Magnitsky.

The author of Russian-language *Universal Arithmetic* (1757) and *General geometry or measurement of extension* (1765).

Kurganov is best known and remembered for his textbook of Russian Grammar of 1793 (Письмовник Курганова).

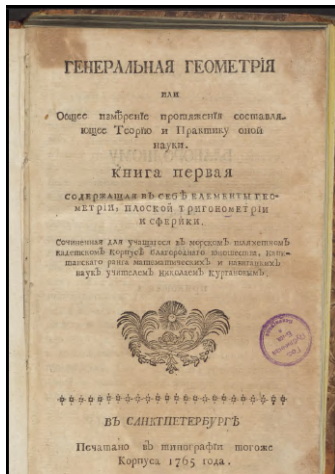
Universal Arithmetic by Kurganov (1757)

The author holds an affiliation to the Cadet Corps, which is another military school for aristocracy founded in 1731 in Saint-Petersburg by the Empress Anna Iohanovna (reign 1730-1740), the book is published by the Academy of Sciences. The textbook is wholly “modern”, it comprises a philosophical preface explaining its purpose and values of learning arithmetic but no archaic features of Magnitisky’s *Arithmetic*.



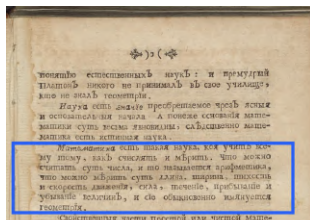
General Geometry by Kurganov (1765)

Includes elements of Spherical geometry.



General Geometry by Kurganov (1765)

On the “artificial” and “natural” logic in mathematics. No need for unnecessary logical elaborations in mathematics. A plausible Cartesian influence via d'Alembert's articles on Geometry, Axiom, etc., in the *Encyclopédie* (1757) that argue against using formal logical means (syllogisms) in mathematical proofs, and perhaps via some contemporary French geometry textbooks (like *Course of mathematics for Guardians of the Flag and the Navy* by Étienne Bézout that appeared the same year 1765).



1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Stepan Rumovsky (Степан Яковлевич Румовский) (1734–1812)

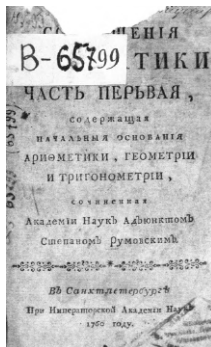
Euler's Russian student who studied under Euler in Berlin in 1754–1756 staying in his house; since 1753 an adjunct member of RAS, and since 1767 a full member.

Stepan Rumovsky (Степан Яковлевич Румовский) (1734–1812)

Euler's Russian student who studied under Euler in Berlin in 1754–1756 staying in his house; since 1753 an adjunct member of RAS, and since 1767 a full member.

Academics versus Military

Abriged Mathematics (Сокращения математики) by Rumovsky (1760)



Abriged Mathematics

Rumovsky's account of logical order in geometry is more traditional (but also closer to today's standard) than Kurganov's.

ПРЕДИСЛОВІЕ.

искусство, и самое разсужденіе противное сему доказываютъ.

Спрогость Математическая, которая соспоитъ въ шомъ, чтобъ ничего кромѣ извѣстнаго, и ясно доказаннаго за основаніе не принимать, нечувствитель-но пріучаетъ разсуждать о вещахъ твердо и основательно. Древніе Философы незнающимъ началъ Математическихъ, то есть Ариѳметики и Геометріи, не позволя-ли пользоваться своими наставленіями, вѣ-дая сколько науки Математическія осп-рятъ, и пріуголовляютъ разумъ къ позн-нію высокихъ вещей. Изъ сего заключитъ

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Euclid's *Elements* in the context of the history of Mathematics Education in Russia

Magnitsky, Mordvinov, Kurganov and their followers primarily used contemporary d'Alembert-style practically-oriented mathematics textbooks and were not particularly interested in studying historical mathematical sources like Euclid's *Elements*.

Euclid's *Elements* in the context of the history of Mathematics Education in Russia

Magnitsky, Mordvinov, Kurganov and their followers primarily used contemporary d'Alembert-style practically-oriented mathematics textbooks and were not particularly interested in studying historical mathematical sources like Euclid's *Elements*.

Unlike their French, British and German contemporaries they did not have the pressure of the earlier Euclidean tradition, and they didn't need to challenge it. Teaching mathematics using Euclid's *Elements* was never a mainstream in Russia.

Euclid's *Elements* in the context of the history of Mathematics Education in Russia

Magnitsky, Mordvinov, Kurganov and their followers primarily used contemporary d'Alembert-style practically-oriented mathematics textbooks and were not particularly interested in studying historical mathematical sources like Euclid's *Elements*.

Unlike their French, British and German contemporaries they did not have the pressure of the earlier Euclidean tradition, and they didn't need to challenge it. Teaching mathematics using Euclid's *Elements* was never a mainstream in Russia.

Nevertheless Euclid did not remain unknown in Russia ...

Ivan Petrovich Satarov (Иван Петрович Сатаров, a medical student in 1707, exact years of his life are missing)

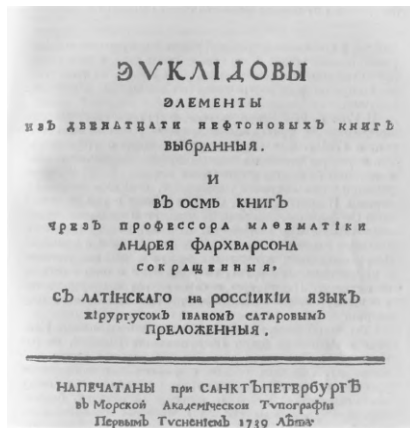
was a military surgeon who served in the Admiralty in Saint-Petersburg. Together with his brother Maxim, also a physician, he translated a lot of classical, humanistic and contemporary literature in various domains of knowledge (Hugo Grotius among others). This included *Euclid's Elements selected from Twelve Newton's Book, abridged to eight books by Andrey Farwarson*.

Ivan Petrovich Satarov (Иван Петрович Сатаров, a medical student in 1707, exact years of his life are missing)

was a military surgeon who served in the Admiralty in Saint-Petersburg. Together with his brother Maxim, also a physician, he translated a lot of classical, humanistic and contemporary literature in various domains of knowledge (Hugo Grotius among others). This included *Euclid's Elements selected from Twelve Newton's Book, abridged to eight books by Andrey Farwarson*.

Andrey Danilovich Farwarson (Андрей Данилович Фарварсон) aka Henry Farquharson (1674-1739) was a student of an Aberdeen college who met Peter in 1699 and was invited by him to teach mathematics in Moscow School of Mathematics and Navigation along with with Magnitsky and others.

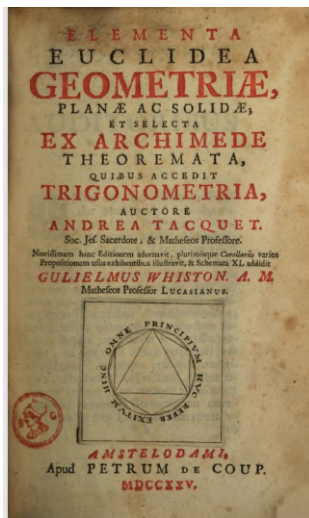
Euclid's Elements selected from Twelve Newton's Book



Euclid's Elements selected from Twelve Newton's Book by Satarov (1739)

Newton in the title is a confusion. In fact, the text is nothing but translation of *Euclid's Elements of Geometry* by André Taquet (the second edition of 1725). The role of Farquharson was likely that of scientific editor. Farquharson did not abridge Taquet's text, this is also a confusion.

Euclid's Elements of Geometry by André Taquet (1725)



Elementa geometriæ planæ ac solidæ by André Taquet (1683)

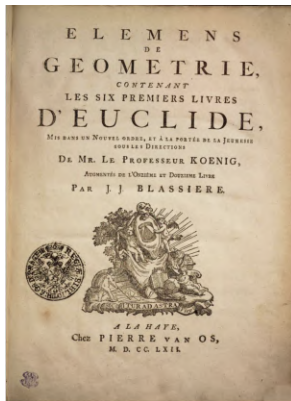
notice the absense of Euclid's name in the first edition!



The Archimedean appendix of Taquet's book was also translated by Satarov and published separately in 1745

Kurganov's Euclid

having accomplished his own geometry textbook in 1765, translated Euclid in 1769 from French from this recent (1762) edition:

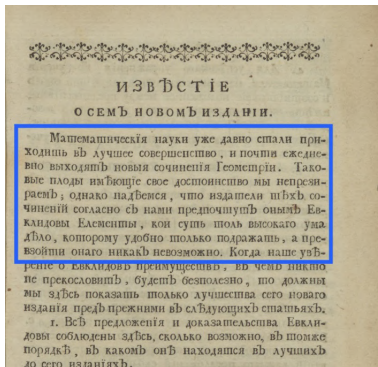


Kurganov's Euclid



Kurganov's Euclid

The statement in the introduction about the alleged perfection of Euclid's *Elements* (which is hardly compatible with Kurganov's claims in his 1765 book) is nothing but a verbatim translation of Koenig.



1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Russian students in Oxford

In **1765** Vassily Nikitin (Василий Никитич Никитин, 1737-1809) and Prokhor Suvorov (Прохор Игнатьевич Суворов, 1750-1815) were sent by Catherine II (reign 1762-1796) to Oxford with a group of 5 other men from Russian Seminaries (Orthodox Christian schools). It has been done in the view of Catherine's projected Protestant-leaning reform of the Russian Orthodox Church, which was shortly abandoned.

Russian students in Oxford

In **1765** Vassily Nikitin (Василий Никитич Никитин, 1737-1809) and Prokhor Suvorov (Прохор Игнатьевич Суворов, 1750-1815) were sent by Catherine II (reign 1762-1796) to Oxford with a group of 5 other men from Russian Seminaries (Orthodox Christian schools). It has been done in the view of Catherine's projected Protestant-leaning reform of the Russian Orthodox Church, which was shortly abandoned.

Vassily Nikitin, graduate of the Academia Slavo-Graeco-Latina and later lecturer on Greek and Hebrew in the same Academia, was appointed to be in charge of the group. Instead of serving as an external supervisor he used the opportunity for pursuing his own studies in the Oxford University.

Passage of Venus of 1769

In 1769 Nikitin distinguishes himself by taking an active part in the observation of a passage of Venus over the Sun along with his Oxford colleagues Thomas Hornsby (1733-1810) and James Williamson (1740-1813).

Passage of Venus of 1769

In 1769 Nikitin distinguishes himself by taking an active part in the observation of a passage of Venus over the Sun along with his Oxford colleagues Thomas Hornsby (1733-1810) and James Williamson (1740-1813).

Later in 1781 Williamson published his commented translation of Euclid's *Elements*. It is conceivable that Nikitin could discuss Euclid with Williamson and be influenced by his methodology.

Academic distinctions

In May 1770 Nikitin receives the *honoris causa* title for his scholarly and scientific activities in the Oxford University.

Academic distinctions

In May 1770 Nikitin receives the *honoris causa* title for his scholarly and scientific activities in the Oxford University.

In 1775 Nikitin and Suvorov graduate — the only members of the original group of 7 Russian students — graduated from Oxford University with a Master degree. At the time it was an exceptional outcome for a foreign subject, which granted him the right “to enjoy ... all the privileges of the native Englishman”.

Return to Saint-Petersburg

In Summer **1775** Nikitin and Suvorov return to Saint-Petersburg and by Catherine's suggestion are appointed as mathematics professors in the Naval Cadets Corps. In addition to his mathematics courses Nikitin also taught Russian and Latin and Suvorov taught English, Mythology and Geography.

Return to Saint-Petersburg

In Summer **1775** Nikitin and Suvorov return to Saint-Petersburg and by Catherine's suggestion are appointed as mathematics professors in the Naval Cadets Corps. In addition to his mathematics courses Nikitin also taught Russian and Latin and Suvorov taught English, Mythology and Geography.

In 1785 the two men were made Knights of the order of St. Vladimir and some time later given high military ranks.

The Russian Academy

aka *Imperial* Russian Academy (Академия Российская, Императорская Российская академия, not to be confused with the Russian Academy of Sciences!) was established in St. Petersburg, Russia, in 1783 by Empress Catherine II of Russia and princess Dashkova as a research center for Russian language and Russian literature, following the example of the Académie Française.

The Russian Academy

aka *Imperial* Russian Academy (Академия Российская, Императорская Российская академия, not to be confused with the Russian Academy of Sciences!) was established in St. Petersburg, Russia, in 1783 by Empress Catherine II of Russia and princess Dashkova as a research center for Russian language and Russian literature, following the example of the Académie Française.

In 1841 after the death of its then-President and Minister of Education Alexandre Shishkov (Александр Семенович Шишков) it was merged into the Imperial Saint Petersburg Academy of Sciences (the Russian Academy of Sciences).

The Russian Academy

Nikitin and Suvorov became members of the Russian Academy on the “second round” in the year of its foundation (1783) (by the presentation of the Director of the Corps Mikhail Golenishev-Kutuzov).

The Russian Academy

Nikitin and Suvorov became members of the Russian Academy on the “second round” in the year of its foundation (1783) (by the presentation of the Director of the Corps Mikhail Golenishev-Kutuzov).

Alexandre Shishkov, colleague of Nikitin and Suvorov in the Corps since 1779, joined the Russian Academy in 1796 and in 1813 became its President.

Nikitin and Suvorov on Russian mathematical terminology (from their *Introduction to Trigonometry* of 1787)

Foreign words have been introduced by foreigners who didn't know Russian language . At this time we didn't care about words because we needed the things themselves. Many peoples avoid using foreign words; the Greeks, the Romans and the Arabs did not use foreign words in their philosophical and mathematical writings . Today the Germans do the same.

Nikitin and Suvorov on Russian mathematical terminology (from their *Introduction to Trigonometry* of 1787)

Foreign words have been introduced by foreigners who didn't know Russian language [FALSE]. At this time we didn't care about words because we needed the things themselves. Many peoples avoid using foreign words; the Greeks, the Romans and the Arabs did not use foreign words in their philosophical and mathematical writings . Today the Germans do the same.

Nikitin and Suvorov on Russian mathematical terminology (from their *Introduction to Trigonometry* of 1787)

Foreign words have been introduced by foreigners who didn't know Russian language [FALSE]. At this time we didn't care about words because we needed the things themselves. Many peoples avoid using foreign words; the Greeks, the Romans and the Arabs did not use foreign words in their philosophical and mathematical writings [FALSE]. Today the Germans do the same.

Nikitin and Suvorov on Russian mathematical terminology (from their *Introduction to Trigonometry* of 1787)

Foreign words have been introduced by foreigners who didn't know Russian language [FALSE]. At this time we didn't care about words because we needed the things themselves. Many peoples avoid using foreign words; the Greeks, the Romans and the Arabs did not use foreign words in their philosophical and mathematical writings [FALSE]. Today the Germans do the same. [MAKES SENSE: J.G. HERDER AT AL.]

Decline of Russian Academy

since 1803: *Discourse on the Old and the New Style of Russian Language* (Рассуждение о старом и новом слоге российского языка) by Shishkov contra Karamzin.

Decline of Russian Academy

since 1803: *Discourse on the Old and the New Style of Russian Language* (Рассуждение о старом и новом слоге российского языка) by Shishkov contra Karamzin.

Alexander Pushkin describes Tatiana in the *Eugene Onegin*:

Она казалась верный снимок du comme il faut ...
(Шишков, прости: Не знаю, как перевести.)

(Shishkov, I'm sorry, I don't know how to translate it.)

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

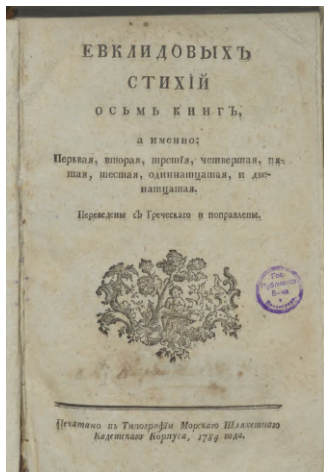
2 Nikitin and Suvorov

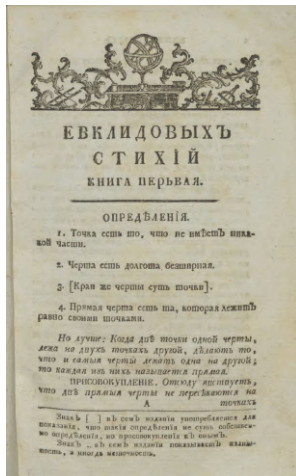
- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Cover

(Translated from Greek and corrected)



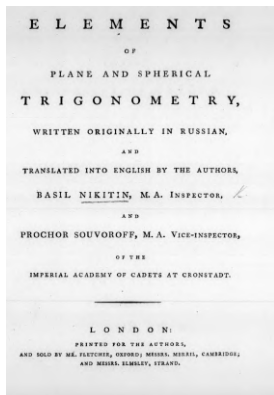


The second edition of 1789

supplemented with Books 13 and 14.

Trigonometry

Also co-authored (Russian edition of 1787 and English of 1786?); it includes the aforementioned Introduction explaining the author's terminological policy in Russian.



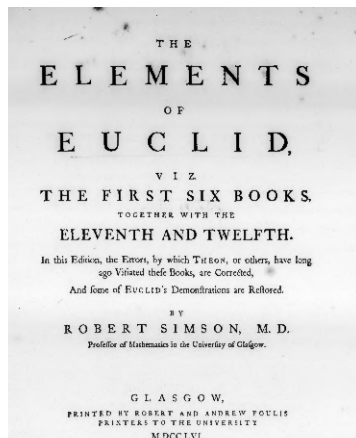
Likely Greek source



At least 12 different English translations of Euclid's *Elements* by
1785 ...

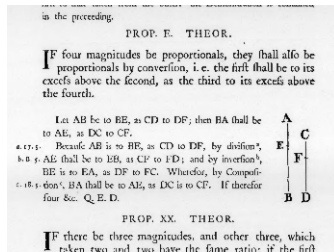
Prototype 1: Robert Simson 1756

The same selection of 8 Euclid's Books and the same numeration system that separates original and added items.



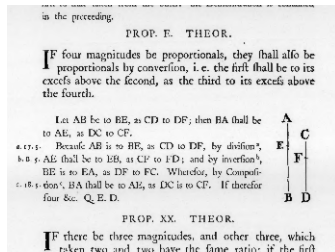
Simson's numeration of Propositions

added items are numerated with letters: example from Book5



Simson's numeration of Propositions

added items are numerated with letters: example from Book5



But Simson departs farther away from Euclid than do N&S

Prototype 2: James Williamson 1781

THE
ELEMENTS
OF
EUCLID,

WITH
DISSERTATIONS,

INTENDED

To assist and encourage a critical examination of these
Elements, as the most effectual means of establishing
a juster taste upon mathematical subjects, than that
which at present prevails.

VOL. I.

By JAMES WILLIAMSON, M.A.
FELLOW OF HERTFORD COLLEGE.

*Est nil dulcius qd, hanc quam veritate sentis
Edere doctrinae sapientiae verba ferunt.* LUGD.

O X F O R D:
PRINTED AT THE CLARENDON PRESS.
MDCCLXXXI.

Prototype 2: James Williamson 1781

A somewhat conservative perspective on Euclid:

*Sed nil dulcius est, bene quam munita tenere
Edita doctrina Sapientum templa serena.*

(Lucr. *De Rerum Natura*, 2.7-8)

Nothing is more delightful than to occupy serene temples, lofty and informed by the teachings of the learned.

Prototype 2: James Williamson 1781

Long (longer than Euclid's texts itself) commentaries aka
“dissertations”; added words are marked with the *italic*. N&S apply
the same convention (but do not write explicit commentaries).

THE
ELEMENTS
OF
EUCLID.
BOOK I.

DEFINITIONS.

A POINT is that of which no part can be taken. **2.** A *LINE* has length without breadth. **3.** The extremities of a line are points. **4.** Any line which lies evenly between the points in itself is a **STRAIGHT LINE**. **5.** A *FACE* is a surface which has length and breadth only. **6.** The extremities of a surface, or lines. **7.** Any surface which lies evenly between the straight lines in itself is a **PLANE**. **8.** But a **PLANE** *ANGLE* is the inclination of lines to one another. *9. If of two lines in a plane, meeting each other and not lying in a straight line. **10.** Also it is called a **RECTILINEAL ANGLE**, when the lines containing the angle are straight. **11.** Thus when a straight line standing upon a straight line makes the adjacent angles equal to one another, each of the equal angles is a **RIGHT ANGLE**; and the standing straight line is called a **PERPENDICULAR** to the other. **12.** *Two* **VERTICAL ANGLES** are those which are made by two straight lines intersecting each other.*

Williamson 1781, Book 5, Def.20 (the inverse proportionality)

20. But perturbate proportion is, when there being three magnitudes and others equal to them in number, it is as in the first magnitudes the antecedent to the consequent, so in the second magnitudes

tudes the antecedent to the consequent; but as in the first magnitudes the consequent is to some other, so in the second magnitudes is some other to the antecedent. Book V.

N&S 1784, Book 5, Def.20

20. Равномѣстіе нестройное примѣрностей
есть, когда перъпая и пторая пеличина, въ
перъпомъ ряду пзаты будутъ съ предпослѣд-
нею и послѣднею пеличиною по пторомъ ряду;
и пторая и третія въ перъпомъ ряду со пто-
рою отъ послѣдней и предпослѣднею по пто-
ромъ ряду; и такъ далѣе подпѣ, псегда въ
противномъ порядкѣ: и изъ сихъ пзаты бу-
дутъ крайнія, а среднія оставлены.

Compare Koenig 1762 (the source of Kurganov 1769)

188

ELEMENTS D'EUCLIDE.

DEFINITIONS.

XX.

Au contraire, l'égalité de raison est appelée *renversée* ou *troublée*, dans le second cas, c. à d. lorsque les raisons de la première suite sont égales à celles de la seconde suite chacune à chacune; en prenant ces dernières dans un ordre renversé.

§. 1. Soient encore les deux suites de grandeurs

$$\begin{array}{l} A, B, C, D \\ a, b, c, d. \end{array} \left\{ \begin{array}{l} \text{ou l'on suppose} \end{array} \right\} \begin{array}{l} A : B = c : d \\ B : C = b : c \\ C : D = a : b \end{array}$$

Ici les raisons de la I suite sont égales aux raisons de la II suite, chacune à chacune, mais dans un ordre renversé, tellement que la raison entre la première & la seconde grandeur de la I suite, est égale à la raison entre la pénultième & la dernière grandeur de la II suite &c. & ainsi de même en avançant dans la première & en rétrogradant dans la seconde.

Si l'on conclut donc que $A : D = a : d$,
on nomme cette analogie *ex æquo inversé* ou *perturbaté*.

§. 2. Les commençans n'auront pas de peine à distinguer le cas de l'égalité ordonnée ou directe, de celui de l'égalité troublée ou renversée, s'ils se souviennent que lorsque deux termes se re-

1 Mathematics education in Russia before 1780

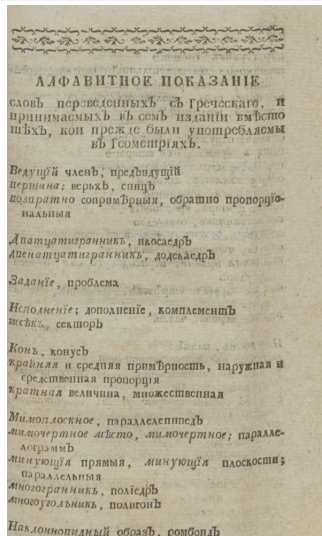
- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

vocabulary (86 entries in total)



Legenda

Legenda

- the term is commonly used today in the same geometric sense

Legenda

- the term is commonly used today in the same geometric sense
- the word is commonly used today outside mathematics in a different sense (may be related or not)

Legenda

- the term is commonly used today in the same geometric sense
- the word is commonly used today outside mathematics in a different sense (may be related or not)
- the term is commonly used today in a different sense *in* mathematics

Legenda

- the term is commonly used today in the same geometric sense
- the word is commonly used today outside mathematics in a different sense (may be related or not)
- the term is commonly used today in a different sense *in* mathematics
- the term/word is no longer used

Legenda

- the term is commonly used today in the same geometric sense
- the word is commonly used today outside mathematics in a different sense (may be related or not)
- the term is commonly used today in a different sense *in* mathematics
- the term/word is no longer used
- the word is not commonly used but can be correctly interpreted by a Russian speaker

Vocabulary 1

New term	Older term(s)	Comment(s)
ведущий член[пропорции]	предыдущий член[пропорции]	The concept belongs to Euclid's outdated theory of Proportion (El., Book 5, Def.12-13) and is no longer used.
вершина	верх, спиц	
возвратно сопримерные [величины]	обратно пропорцио- нальные [величины]	
двадцатигранник	икосаэдр	
задание	проблема	Another common modern synonym is "задача" (problem)
исполнение	дополнение, компле- мент	
иссек	сектор	In SNEI this term is found only in the inverse list of terms.
кон	конус	

Vocabulary 2

New term	Older term(s)	Comment(s)
многогранник	полиэдр	
многоугольник	полигон	Russian word “полигон” in its current usage means a military training ground.
наклонновидный образ	ромбоид	ромбоид (romboïde) is an outdated concepts deriving from ῥόμβετα οειδές in Eucl. El. Def. 1.22, which is co-extensive with a parallelogram. Euclid uses expression “parallelogramic area” (παράλληλογράμμων χωρίων) (for example, in Prop. 1.34) without defining it.
наклонный образ	ромб	
накрест [лежащие] углы	свершные [имеющие]	“накрест < лежащие < углы”

Vocabulary 3

New term	Older term(s)	Comment(s)
неравноожный треугольник	неравносторонний, разносторонний треугольник, скален	The concept is largely outdated, at least in Russian mathematics education.
нетощее	тело, толстота, солид	
нетощий	толстый	Today's term is трехмерный (three-dimensional).
обвод	окружение, окружность	
обмер	сумма всех сторон	Standard today's term is периметр, which is a phonetic calque from Greek
образ	геометрическая фигура	
общие понятия	аксиомы	Although аксиома is a standard term for axiom but in historical literature expression "общие понятия" (common notions), which literally translates Euclid's term κοινὰ ἔννοια, is equally used.
определение	дефиниция	
ось	центр, средоточие	
восьмигранник	октаэдр	
обвод, что отвлнутрь	вогнутый	

Vocabulary 3

New term	Older term(s)	Comment(s)
полукружие	полкруга	Today's standard Russian equivalent is полукруг (semicircle)
полуразмер	радиус	
поперечник	диагональ	
правая прямая (или плоскость), прямая или плоскость в правых углах	перпендикулярная прямая (плоскость)	
правоугольник	прямоугольник, [облонг]	
прямоугольный	прямоугольный	
правый угол	прямой угол	
предложение примерности	обращение содержания	The current term for this concept is обратное отношение (inverse ratio).
сторона при углах	сторона прилежащая углам, смежная [сторона]	Cf. today's "признак равенства треугольников по стороне и прилежащей к ней углам" (establishing equality of triangles by a side and two adjacent angles). In the modern mathematical Russian "смежные стороны"

Vocabulary 4

New term	Older term(s)	Comment(s)
равноместие	равенство содержания, содержание от равенности	In today's Russian the concept is rendered as "пропорциональность" (the proportionality).
нестройное равноместие	обратное равенство	In today's Russian the concept is rendered as "обратная пропорциональность" (inverse proportionality).
стройное равноместие	прямое равенство	In today's Russian the concept is rendered as "прямая пропорциональность" (proportionality).
равноножный треугольник	равнобедренный, равнобокий треугольник, исосцелес	
равночастные	[имеющие] равные части	The concept belongs to Euclid's outdated theory of Proportion (SNEI., Book 5, Def. 2A) and is no longer used.
разделение примерности	вычитание содержания	The concept belongs to Euclid's outdated theory of Proportion (SNEI., Book 5, Def. 16) and is no longer used.
размер	диаметр, поперечник	In today's Russian "размер" stands for size; "поперечник" is non-mathematical term that may refer to the maximal diameter of a tree trunk or another material object of appropriate geometrical form.

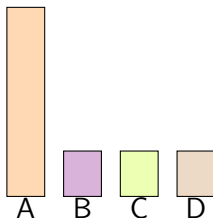
Vocabulary 5

New term	Older term(s)	Comment(s)
стихии	элементы	Russian word "стихии" (in singular "стихия") etymologically derives from Greek "στοιχεῖα" which is the original title of Euclid's <i>Elements</i> . In modern Russian this title is usually rendered as начала (foundations). Word "стихия" is presently used in a very different meaning of uncontrollable <i>force of nature</i> , typically related to a natural disaster like a sea-storm.
стопа	основание, баз	a feminine version "база" is widely used in mathematics (and also elsewhere) but usually not in this particular geometrical context.
сопимерность	пропорция	Although Euclid's theory of Proportion presented in Books 5-6 of his <i>Elements</i> is no longer taught in its original non-algebraic form the concept of direct and inverse proportion are still found in modern mathematics textbooks.

Vocabulary 6

New term	Older term(s)	Comment(s)
четырёхгранник	тетраэдр	
четырёхкрайник	трапеция, трапеза, траpezий	Word "четырёхкрайник" is not used but its modern equivalent "четырёхсторонник" (quadrilateral) can be used in some specific context. Geometric term "трапеция" (trapeze) is common but it stands not for a general quadrilateral but for one that has two parallel sides. Word "трапе-за" in the modern Russian refers to a meal.
четырёхугольник	квадрат	Both words are commonly used in the modern mathematical Russian but not interchangeably: the former refers to a general quadrangle and the latter to a square.
шар	сфера	Both words are commonly used in the modern mathematical (as well as non-mathematical) Russian but not interchangeably: the latter (a sphere) is usually defined as 2-dimensional

Statistics



A — older terms mentioned by S&N have been preserved (58 per cents of cases);

B — new terms proposed by S&N have been adopted (14 per cents of cases);

C — the terms of categories A and B found in S&N are no longer used and replaced with some other terms (14 per cents of cases);

D — the geometrical *concept* denoted by the terms of categories A and B is no longer used and has no conventional name in today's Russian (14 per cents of cases).

1 Mathematics education in Russia before 1780

- Magnitski
- Mordvinov
- Kurganov
- Rumovsky
- Russian Euclid (by 1780)

2 Nikitin and Suvorov

- Studies in Oxford University
- Russian Academy (1783-1841)
- Nikitin and Suvorov's Elements (1784)
- Nikitin and Suvorov's vocabulary

3 Conclusions

Conclusion 1

Translation of Euclid's *Elements* by Nikitin and Suvorov (1784, 1789) is the first translation of this text in Russian made from the original Greek (as reconstructed by Gregory in 1703). The translators consulted the Greek text and introduced their additions and “corrections” carefully distinguishing between the original and their corrections.

Conclusion 1

Translation of Euclid's *Elements* by Nikitin and Suvorov (1784, 1789) is the first translation of this text in Russian made from the original Greek (as reconstructed by Gregory in 1703). The translators consulted the Greek text and introduced their additions and “corrections” carefully distinguishing between the original and their corrections.

Nikitin and Suvorov's *Elements* can be compared with the 1756 English translation by Simson but it is more conservative.

Conclusion 2

In Russian Mathematics Education Euclid's *Elements* didn't play quite the same role as in France, England and other countries having long mathematical tradition. Mathematics Education was nearly non-existent before 1703 (Magnitsky) and it prioritised the d'Alembert-style “modern” approach in teaching geometry to begin with. Legendre certainly had a stronger influence on teaching Elementary Geometry in Russia than did Euclid.

Conclusion 2

In Russian Mathematics Education Euclid's *Elements* didn't play quite the same role as in France, England and other countries having long mathematical tradition. Mathematics Education was nearly non-existent before 1703 (Magnitsky) and it prioritised the d'Alembert-style "modern" approach in teaching geometry to begin with. Legendre certainly had a stronger influence on teaching Elementary Geometry in Russia than did Euclid.

Notwithstanding this mainstream, Euclid's *Elements* made their way to the Russian reader through Nikitin and Suvorov, Petrushevsky (1819) and some later translations. The interest to Euclid revived in Russia in the beginning of the 20th century when Hilbert's *Foundations of Geometry* of 1899 and the related literature was read and translated. But this is a different story.

Conclusion 3

Nikitin and Suvorov's linguistic experiment today appears as a historical curiosity. It is hard to say how much it really contributed to the development of today's geometrical terminology (given that some of their alleged terminological innovations were not genuine inventions like in the case of “точка”).

Conclusion 3

Nikitin and Suvorov's linguistic experiment today appears as a historical curiosity. It is hard to say how much it really contributed to the development of today's geometrical terminology (given that some of their alleged terminological innovations were not genuine inventions like in the case of “точка”).

But it helps us to study the role of natural languages in mathematics, and rises many interesting questions concerning the diachronic aspects of mathematical terminology.

Open Questions

In particular, it remains an open question

Open Questions

In particular, it remains an open question

- What exactly Nikitin and Suvorov took for the “established” Russian mathematical terminology when they tried to reform it?

Open Questions

In particular, it remains an open question

- What exactly Nikitin and Suvorov took for the “established” Russian mathematical terminology when they tried to reform it?
- Did they rely only on published sources or also on an oral teaching practice?

Open Questions

In particular, it remains an open question

- What exactly Nikitin and Suvorov took for the “established” Russian mathematical terminology when they tried to reform it?
- Did they rely only on published sources or also on an oral teaching practice?

We leave these and other related questions for a further study.

Thank you for your attention!

Vielen Dank für Ihre Aufmerksamkeit!

Merci pour votre attention !

Спасибо за внимание!