Andrey Kiselev: the Life and the Legend

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Abstract

This article is devoted to Andrey Kiselev, probably the most well-known Russian author of mathematics textbooks. His books remained in schools for nearly one hundred years, and his name became legendary, symbolizing the "good old days" when all was supposedly well with mathematics education. Meanwhile, even in Russia, let alone abroad, many aspects of Kiselev's life are little known. Their study facilitates a better understanding of the complicated nature of the development of Russian and Soviet mathematics education, including the connection between them and seemingly distant social-political issues. The present article undertakes such a study. The author draws on his Russian publications, materials from Russian archives, and other primary sources.
Keywords: Russian mathematics education, textbooks, politics.

Resumo

Este artigo trata de Andrey Kiselev, provavelmente o mais conhecido autor russo de livros didáticos de matemática. Seus livros permaneceram nas escolas por quase cem anos, e seu nome tornou-se uma lenda, denotando os "bons velhos tempos" quando tudo parecia estar bem com a educação matemática. Entretanto, mesmo na Rússia, e muito menos no exterior, muitos aspectos da vida de Kiselev não são bem conhecidos. O estudo desses aspectos ajuda a compreender a natureza complexa do desenvolvimento da educação matemática russa e soviética, inclusive suas relações e as aparentes questões sócio-políticas distantes. Este artigo apresenta tal estudo baseando-se em suas publicações em russo, materiais encontrados em arquivos da Rússia e outras fontes primárias.
Palavras-chave: educação matemática russa; livros didáticos; política

Introduction

The name of Andrey Kiselev has been and remains one of the most famous and most often mentioned names in Russian school mathematics education. The author of this article studied using Kiselev's textbooks, as did the author's father and grandfather. Although these textbooks officially ceased to be used in schools almost 40 years ago, new editions of them continue to appear from time to time, since they have long ago become part of a legend about how good things were once upon a time. On the Russian Orthodox educational portal *Slovo*, for example, in an article by Yuri Kolyagin (n.d.), a

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member of the Russian Academy of Education, there appears the following passage[2]:

> The generation that was taught using A. P. Kiselev's textbooks entered life with respect for knowledge and the ability to gain it. The Soviet people, who had received a many-faceted and thorough education, transformed the USSR into a mighty industrial nation, emerged victorious from the Great Patriotic War [WWII], launched the first man-made satellite around the Earth, made possible Yuri Gagarin's flight into outer space, and distinguished themselves in many, many other ways.

The same website features an article by I. P. Kostenko (n.d.), characteristically titled: "Why We Should Go Back to Kiselev."

In the West, Kiselev's name is far less known, although as late as 1933 his algebra textbook was published in English in the Soviet Union—"for children of foreign workers" (KISELEV, 1933) —while in very recent times his geometry textbook was published in English in the United States (KISELEV, 2006). The aim of this article is to give an account of Kiselev's life. In what follows, the author will refer to his own Russian publications (KARP, 2002).

1. The Teacher's Formation and Career

Kiselev was born in 1852 in Mtsensk in Oryol Gubernia, a city usually familiar only to music-lovers, who know Dmitri Shostakovich's famous opera *Lady Makbeth of the Mtsensk District* based on the novella by Nikolai Leskov. The world of provincial merchants described by Leskov was the world into which Kiselev was born. His family, however, had no wealth. Surviving documents (KISELEV, n.d.) indicate that the boy could not have paid for his own education: he was supported by merchant-acquaintances and by the educational institutions that he attended.

Kiselev was a good student and graduated from the gymnasium with a gold medal. Avdeeva (2005), who has studied the manuscripts of his teachers that have survived in archives, believes that these teachers influenced Kiselev's pedagogical approach, including his textbooks. Undoubtedly, Kiselev's teachers did have an influence on him, but it is probably more correct to speak less about concrete people than about a highly developed tradition to which these people belonged. One of the aspects of this tradition was that many people wrote textbooks (among Kiselev's mathematics teachers, at least

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[2] This and subsequent translations from Russian are by the author.

two had done so).

After finishing the gymnasium, Kiselev enrolled in St. Petersburg University, which boasted several first-rate mathematicians during those years (Pafnuty Chebyshev, to name just one). In 1876, after the university, Kiselev taught mathematics, mechanics, and drawing at the Voronezh *real school*. It was in Voronezh that he spent most of his years of actual teaching (if we do not count one very brief transfer—effectively for a year—to a gymnasium in Kursk, and then to a *real school* in Kharkov).

Here, it should be said that official (government) secondary educational institutions varied. The main types were *gymnasia* and *real schools*, whose structures largely corresponded to German models. Gymnasia granted more privileges—only their graduates could enter universities; but the mathematics courses in *real schools* were, probably, bigger. *Real school* graduates could enter technical higher educational institutions. Alongside of these institutions, there were also military schools—in particular, military corps. Historically, precisely military educational institutions (particular, naval schools) had been the centers of mathematics education (KARP, 2007), and in Kiselev's time they continued to be highly demanding.

Teachers in both government civilian and military educational institutions were considered government officials. Like all other government workers, teachers were assigned ranks, in accordance with the unified system of ranks established by Peter the Great in the eighteenth century, which encompassed the army, the navy, and the civil and court services. A teacher who had served irreproachably for the requisite time could quite well end his career, like Kiselev, in the rank of *state counselor*, which corresponded to the military rank of *brigadier*—no longer used at that time—a rank that was above that of a colonel, although below that of a major general.

Beginning in 1892, Kiselev began teaching full-time at the Voronezh cadet corps (where he had been employed part-time previously), continuing to teach there until his retirement in 1901. About his teaching style we know little. His valedictory notice to the cadet corps noted that he had "always been even-handed, calm, and serious in class, and demanding in his assessment of students' knowledge" (KARP, 2002, p. 6). He was clearly well-regarded by his superiors, as attested to by the honors he received. Surviving documents depict a moderate and realistic person who was well aware of the shortcomings of the school, but sought to remedy them not through radical

transformations, but by means of rational improvements.

We posses, for example, a virtually verbatim transcript of a report delivered by Kiselev in 1907 before the Voronezh city Duma (Council), of which he was a member, concerning examinations (printed in KARP, 2002). At that time, the liberally-minded public took a decisive stand against examinations as a practice that constrained students, engendered a regime of rigid control, and so on. Kiselev spoke about the various "aberrations" in the schools: the fact that classes were overcrowded, the fact that there was not enough time properly to interview and assess all of the students in a class, the fact that school schedules were poorly designed, as a result of which there were "empty" lessons at the end of the year, which students spent playing games. He spoke about the importance of independent work and examinations as a means of instigating students to engage in such work, and he pointed out that an examination is often the teacher's only opportunity thoroughly to evaluate the students. He concluded his report, however, not by urging that examinations be preserved, but merely by recommending that no support be given to petitions for their elimination, leaving the decision to others. In the event, the Duma did not back this recommendation either.

2. Andrey Kiselev as the Author of Textbooks

Far more is known about Kiselev's work as an author of textbooks than about his work as an actual teacher. As has already been said, many people wrote textbooks at that time. There were popular textbooks and problem books by famous mathematicians or mathematics educators—for example, by Moscow University professor Avgust Davidov (geometry) or the director of the Moscow Pedagogical Institute, Alexander Malinin (whose most famous textbook, coauthored with Konstantin Burenin, was in arithmetic). Teachers wrote textbooks as well (the same Burenin). There was a protocol for getting official approval for textbooks, or more precisely, for procuring access to government educational institutions for textbooks, which relied on analysis and reviews of the textbooks.

Kiselev's first textbook was his "Systematic Course in Arithmetic for Secondary Educational Institutions," published in 1884. In 1888, he published his "Elementary Algebra." In 1892, his "Elementary Geometry" appeared. These books were not all. Kiselev prepared several versions of these texts for different kinds of educational institutions, but in addition to them he wrote several other books in other subjects, too—

including a textbook in physics and a textbook in differential and integral calculus. These last textbooks, however, although they, too, went through multiple editions, could not be compared with the first three textbooks mentioned above in terms of their popularity.

Indeed, Kiselev's "Arithmetic," "Algebra," and "Geometry" became very popular. A surviving notebook of Kiselev's indicates that, for example, in 1915 alone his earnings from "Arithmetic" and "Algebra" were ten times greater than his annual pension (which was, it should be noted, almost a general's pension). Kiselev moved to St. Petersburg, closer to the publishers, and there bought two large apartment buildings (there exists a photograph of Kiselev standing in front a building beside his car—the doorman is opening the car door for him, and the driver is already sitting behind the wheel).

Kiselev's books gradually came to embody the traditional style of teaching. At the All-Russian Congress of Mathematics Teachers, a teacher from Elizavetgrad, V. M. Kupershtein, for example, made the following remark:

> I'm certain that all here assembled remember their own childhood perfectly well, when in the lowest grades of the gymnasium they studied arithmetic. More than once, I would think, they cursed Kiselev's and Malinin's textbooks. In my opinion, such techniques for teaching arithmetic in the lowest grades are a blight that eats away at children's souls, developing in them a feeling of revulsion toward arithmetic (TRUDY, 1913, p. 253).

This opinion, however, was by no means shared by everyone—Kiselev's books, as has been indicated, were purchased in great quantities, even though no one imposed them on anybody. Their author, naturally, strove for success and even used methods that had not yet become commonplace—sending out free copies to the editorial offices of journals and to teachers. On the whole, Kiselev did not regard poverty as a virtue; there is a story about how, already in Soviet times, in response to the question, "Why did you start writing textbooks?" Kiselev stated, frightening everybody, that he wanted to become well-to-do (KARP, 2002). And yet, the success of these books can by no means be explained by marketing techniques alone.

When Kiselev's geometry came out, reviewers noted that it was "structured in accordance with the views on the exposition of this subject that have been expressed by the authors of the latest French and German handbooks, particularly the former" (NASHA UCHEBNAYA, 1893, p. 26). Indeed, Kiselev's "Geometry," which is

published today as an embodiment of the Russian experience, in many ways relied on the experience of other countries.

Kiselev himself, listing the distinctive features of his textbooks, usually began with mathematical details, such as the fact that he defined the length of a circumference as a limit, while this was not always done in the textbooks of other authors. But the central differences between Kiselev's and others' textbooks, we would argue, lay elsewhere.

Kiselev's textbooks came out on top because they were exemplars of a teacher's common sense and experience. The well-known Russian mathematics educator Ivan Andronov (1941) once wrote that Kiselev knew his strengths and did not undertake that for which his strengths might not have been sufficient. Kiselev's textbooks are well-organized and logical (later, they were found to contain not a few logical gaps, but all of these were beyond the understanding of the ordinary student). In the course in geometry—Kiselev's most popular course—practically all of the assertions are grounded and proved. But Kiselev never tried to offer a strict axiomatic course with complete indication of axioms and all of the references that a professional mathematician would have considered necessary.

For example, the theorem that the diagonals of a parallelogram bisect each other was one of the easiest in his textbook—it was proved using congruent triangles. The authors of the textbooks that eventually replaced Kiselev's entirely correctly pointed out that this proof omits a crucial point: it assumes that the diagonals do in fact intersect and form triangles (students, of course, could not have been expected to raise such an objection). While recognizing the elegance of the new proofs that were offered to rectify this omission (KARP; WERNER, 2011), we cannot fail to notice that they were incomparably more difficult for students.

The system of problems offered by Kiselev can be criticized from a modern viewpoint as incomplete—the geometry textbooks, for example, did not have enough computation problems. Nonetheless, it was well-planned and allowed teachers rationally and methodically to construct lessons and homework assignments. Finally, we cannot fail to mention the language of Kiselev's textbooks. Kiselev is always precise and always concise. He always explains what is being done and how, but at the same time understands that superfluous words are unacceptable in a textbook, just as they are in class—the student loses the thread and becomes distracted.

Kiselev provided proofs when the student felt the need for a proof, and he did so in a way that permitted the student to read and memorize the proof relatively quickly and without getting distracted. Lessons based on his textbooks were easy to plan and to teach. That is why teachers strove to use his textbooks.

3. A.P. Kiselev in Politics

In pre-Revolutionary Russia, it was difficult for an educated person not to be involved in politics. Kiselev did not remain outside of politics either, and surviving documents help to understand him better as a person and as a public activist.

As has already been said, for many years Kiselev was a voting member of the Voronezh city Duma. He sat on a great number of educational institutions' supervisory boards. He gave public lectures and even ran for the Russian National Duma on the Union of October 17 Party ticket.

The name of this party derived from the "October Manifesto" promulgated by Czar Nicholas II on October 17, 1905, in response to the revolution unfolding in Russia. This manifesto established a parliament in the country (the Duma) and proclaimed fundamental democratic rights. The Union of October 17 (also known as the "Octobrists") is usually characterized as a right-liberal party, which included bureaucrats, the landowning aristocracy, and the large-scale commercial and industrial business classes.

To the left of this party were the Constitutional Democrats. Kiselev struggled quite actively against the Constitutional Democrats' views. The Voronezh newspapers of 1906 (reproduced in part in KARP, 2002) contain accounts of a tumultuous meeting at which Kiselev objected to Vasily Maklakov, a famous lawyer and one of the leaders of the Constitutional Democratic Party, who had come to Voronezh. Among other things, Kiselev reproached the Constitutional Democrats for their excessive vehemence in attacking the monarchy and for their excessive insistence on the right to self-determination for Russia's colonies, first and foremost the Kingdom of Poland. This, argued Kiselev, was not the most pressing issue. The most pressing issue, according to him, was the agrarian question. On this question—which was indeed of great importance, since the peasants did not have enough land—the Octobrists likewise rejected radical measures such as the confiscation of land from landowners, and instead

proposed programs for resettling peasants to unoccupied lands or, as a last resort, purchasing lands from landowners.

In describing Kiselev's position, it should be borne in mind that the Octobrists' party, which was considered relatively right-wing (and there were several parties that were considered far more left-wing than the Constitutional Democrats, including the Bolsheviks, who eventually came to power), was incomparably more liberal than many existing organizations and the government itself. It was no coincidence that, when in 1905 Jewish pogroms were taking place in Voronezh, members of the city Duma considered it essential to dispel the crowd's conviction (which, it appears, was not unfounded) that the pogroms had the support of the government (POSTANOVLENIYA, 1905). In order to get the government to take the necessary measures, a special delegation was sent to the governor. Kiselev was a member of this delegation.

Kiselev did not get elected to the Russian National Duma, but he did a great deal of day-to-day work in the city Duma, devoting himself to what were then called "minor matters." At times, these matters were not all that minor. For example, during the final decades of the Russian empire, literacy in the country was growing rapidly (from 28% in 1897 to 56% in 1916). Kiselev was one of those who took practical steps to facilitate the spread of education.

The changes and reforms, however, constantly ran up against opposition from the government, and they had been initiated too late anyway. The result was the October Revolution of 1917, which put the government into the hands of the Bolsheviks.

4. After the Revolution

For Kiselev, the Revolution meant the collapse of his whole established way of life. His houses and pension disappeared, and most importantly, his textbooks came under threat. Reformers came to power, and their goal was, as they said, the formation of the "free man", not teaching mathematics. They proposed to form the free man without grades and examinations, as well as, ideally, without mathematics as a separate subject (KARP, 2009, 2010). The reformers found the practices developed by American progressive education to be consonant with their new goals (with the addition, naturally, of their own Communist phraseology). Textbooks in general came to be seen as something superfluous—students were expected to learn directly in the process of working and

observing others at work. Kiselev's textbooks became, as it were, a showcase of what not to do, in accordance with the new rules.

This does not mean, of course, that they were not used. The government could not intervene everywhere. Teachers who continued to teach in the schools that continued to exist (for the number of schools and students fell sharply during the years of the civil war, which began after the Revolution) inevitably had to use something, and of course, some of them used Kiselev's textbooks, too, especially because there was often no one to enforce government guidelines. After the civil war, during the so-called New Economic Policy, which in some measure permitted private initiative, Kiselev's textbooks were even reissued in comparatively large numbers, as manuals for labor schools. This, however, in no way accorded with the official pedagogical ideology, but rather had to be considered a glitch in the system, which had simply not yet been eliminated.

Kiselev himself during the years immediately following the Revolution made his way back to Voronezh, where food was less scarce than in St. Petersburg, and had to return to teaching (in local colleges). Returning to St. Petersburg (then called Petrograd, and shortly renamed Leningrad) with the start of the New Economic Policy, he taught at military educational institutions and continued to write and publish new books, for example, "Irrational Numbers Considered as Infinite Non-repeating Decimals," a manual that came out in 1923.

Everything changed when the government, embracing a policy of accelerated industrialization (including, and above all, the development of the military industrial complex) and abolishing the New Economic Policy in 1929, changed its policies in the sphere of education as well. A series of resolutions by the Central Committee of the Communist Party from 1931 to 1936 radically transformed the education system. These resolutions criticized schools for failing to provide students with sufficient knowledge, and thus failing to prepare them for higher education. Former goals and experiments were repudiated as idle fantasies. The government began to demand systematic and thorough study of the main subjects, and first and foremost of mathematics.

For many, the turnaround was quite unexpected. Tsigler (1931), for example, in a magazine characteristically named "On the Front of Communist Education," wrote: "What the Central Committee's resolution says about systematic knowledge and skills

should not be seen as a call backward, to 1916, to Kiselev, Vereshchagin, and others" (p. 14). It turned out, however, that no one satisfied the new demands better than old, tried-and-true Kiselev. His textbooks were updated and expanded (A. N. Barsukov edited the algebra textbook, N. A. Glagolev the geometry textbook, and A. Ya. Khinchin the arithmetic textbook), and began to be published in hitherto unheard-of numbers as the only textbooks, which were now mandatory for the whole country. Initially, this arrangement was regarded as provisional, with the expectation that new, modern textbooks would subsequently be selected in the course of actual teaching (NOVOSELOV, 1938). Things turned out differently. Kiselev's textbooks continued to be used for many decades. Gradually, "Arithmetic" and "Algebra" went out of use, but "Geometry" hung on in schools until 1976, when the second part of the textbook— "solid geometry"—finally ceased to be used.

Kiselev himself died in 1940, pampered by the authorities, a recipient of the Order of the Red Banner of Labor with a special pension. At home, according to relatives' recollections, politics were never mentioned, nor were family members living abroad ever spoken of (KARP, 2002). Kiselev is buried in Volkovo Cemetery in St. Petersburg and his tombstone states: "A.P. Kiselev, author of mathematics textbooks."

Discussion and Conclusion

Kiselev's life is of interest not only to those studying mathematics or mathematics education. Those who advocate a rejection of "bad" textbooks and the use of a single, government-sanctioned "good" textbook would do well to bear in mind that Kiselev's textbooks appeared because there were many textbooks and it was relatively easy to publish a textbook. Kiselev's own triumphant return to schools and the transformation of the former Octobrist into a hero of Soviet pedagogy is illustrative of the changes that occurred under Stalin. Revolutionary schools, that called for freedom (even if only demonstratively), were replaced by schools whose ideal were the pre-Revolutionary schools of "routine and memorization by rote." After World War II, Stalin came to embrace separate education for boys and girls on the model of pre-Revolutionary gymnasia, a single set of examinations for the whole country (something that had never existed even before the Revolution), and monitoring and control over teachers and students that went beyond anything that had been seen before. Mathematics, however, turned out to occupy a privileged position in Stalin's country. Its teaching, already in

pre-Revolutionary times, had produced a storehouse of experience and traditions. During the 1930s, these became accessible if not to all, then to almost all schoolchildren, and this is what brought Russian school mathematics its deserved fame.

Millions studied using Kiselev's textbooks, and their proofs and arguments, their relatively complex transformations and algorithms, became accessible to millions. This alone refutes the "brutal pessimism" described by Ravitch (2000), which holds that virtually the majority of children are incapable of such learning and which to this day continues to exert an enormous influence on educational practices around the world. It turns out that children can be taught a great deal if they are taught well and under appropriate conditions.

Today, it is not difficult to object to those who believe that teachers could go back to Kiselev's textbooks and in this way bring about a universal rebirth in mathematics education. It is precisely because they ceased to correspond to surrounding life and its demands that educators stopped using them and do not go back to them. Some of the sections in these textbooks were too difficult for schools that are not expected to have a significant dropout rate (in the 1940s-50s, failing students could often constitute 15%-20% of a school's student body, which became unthinkable in subsequent years); the textbooks contained very few real world problems; they presented no mathematical ideas that were in any sense modern (such as even the coordinate method in geometry); and indeed, they had been written for a completely different era and for completely different readers. Kiselev's books may have been embodiments of realism, but reality had changed.

And yet, the opposition between reality and fantasy in teaching did not vanish. That which people would like to be true is very often taken for reality, and textbooks and curricula are not infrequently based on preconceptions embraced in advance and not necessarily in any way connected with reality. Kiselev remains a vivid example of the art of countenancing reality and real experience. Legends have survived about how Kiselev, an experienced teacher himself, wrote down teachers' minutest observations and subsequently attempted to make use of them. It would do well to keep this in mind in an age when a textbook is all too often an ordinary commercial product, contributed to by dozens of people who are frequently in no way connected with schools, while working teachers are included in the lists of authors merely as decorative figures.

On the other hand, Kiselev's skill and the obvious success of teaching based on his textbooks have sustained and continue to sustain the false impression that methodological skill by itself can solve all problems in education. Kiselev was a master of the possible, but precisely only of the possible. His life shows how much can be accomplished under the right conditions (even given all of the "aberrations," as he himself called them). But one should not wait for a second Kiselev who will all by himself remedy all of the existing ills in education.

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