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A FIGHTER FOR RED INTEGRALS (ON L.A. LEIFERT)

Summary: The title of this paper refers to reminiscences about Leningrad University professor Leonid Leifert, who explained to his students that even in seemingly the most abstract mathematical disciplines, the struggle between the revolutionary and the White Guard elements continued, and there were, therefore, red integrals and white integrals. After the revolution of 1917, Leifert became a member of the Communist Party and one of the most zealous implementers of what the party demanded. In this capacity, he had to fight with Leningrad's (St. Petersburg's) most prominent mathematicians and write about the methodology of mathematics instruction – one of the first Soviet textbooks on the subject was edited by him. But although he himself did not waver in implementing the party's decisions, the party line itself wavered, and already in 1932 he had to repent for pernicious ideas that he had deviously promoted just a year earlier. This did not help him, and in 1938 he was executed. The present study contains an investigation of Leifert's biography and his works, never undertaken before and useful for a better understanding of what went on at the time. It draws on archival materials and published works from the period under investigation.

Keywords: mathematics education, Russia, mathematical front, Leningrad University

Introduction

This article is devoted to the life and work of one of the most notable figures in Russian post-revolutionary mathematics education, Leonid Leifert. People have left recollections – from which this article draws its title – about how Leifert, while lecturing at the mathematics department, explained that ideol-

ogy penetrates all parts of life, even the most seemingly abstract ones, such as mathematics, and consequently, that there are red (revolutionary) and white (counterrevolutionary) integrals[1]. During the lectures, students laughed, but to conclude that Leifert was simply poorly educated (as the author of this paper himself unfortunately sustained at one time[2]) would probably be misguided. The matter is far more complicated. Post-revolutionary changes brought the most varied kind of people to the fore, and this happened in mathematics education as well as in other fields. The analysis of what these people did, said, and wrote, just like the analysis of what happened to them, helps to understand what happened in education, and more broadly, in the life of the country. This study makes use of surviving archival information and of publications from the period under investigation.

The life of L.A. Leifert before the Revolution of 1917

A copy of a birth certificate has survived, signed by the acting rabbi of St. Petersburg, stating that on April 20, 1892, a son was born to Abram Pinkhasovich Leifert[3], a merchant of the Second Guild in St. Petersburg, and to his lawful wife, Hanna Leibovna, to whom the name Leonid was given according to the laws of the Jewish religion[4]. Later, under the Soviet regime, being born into a merchant family could cause difficulties, and party member Leifert indicated in official documents that his father had been an 'entrepreneur'[5]; or if he did indicate that his father had been a merchant, he immediately explained that he had started out as

[1] *Venttsel' E.S. – I. Grekova. K stoletiiu so dnia rozhdeniya. Sbornik*, ed. by R.P. Venttsel', G.L. Epstein, Izdatel'skii dom Iunost', Moscow 2007.

[2] A.Karp, *Reforms and counter-reforms: Schools between 1917 and the 1950s*, [in:] *Russian mathematics education: History and world significance*, ed. by A.Karp, B. Vogeli, World Scientific, Hackensack, NJ 2010, p. 43–85.

[3] Albin Konechnyi provides the following information (in *Byloy Peterburg: proza budney i poeziya prazdnika*, NLO, Moscow 2021): 'Leifert, Abram Petrovich (Abram-Pinkas) (1849–1912?) became a merchant of the Second Guild in 1877; owned a loan office (1877–1888), a furniture store (1892–1898), a shop that manufactured wallpaper and theatrical props (1899–1905), and a small typolithographic business (1890s–1911). Leifert played a notable role in organizing spectacles and entertainments. He was a booking agent for the Diversion and Benefit Theater (1880–1898); owned the Hall of Public Entertainments at Fontanka Embankment, No. 80 (1889–1891). In the 1890s, he organized public festivities at the Mikhailovsky Manege and the America Amusement Garden, and was a member of Vasileostrovsky Public Entertainment Society'. All translations from Russian are by the author.

[4] Tsentralnyi gosudarstvennyi istoricheskiy arkhiv Sankt Peterburga – Central State Historical Archive of St. Petersburg [TSGIA SPb.], Lichnoe delo Leiferta Leonida Abramovicha, n.d., f. 14, op. 3, d. 55122, p. 35.

[5] Rossiiskii gosudarstvennyi arkhiv voenno-morskogo flota – Russian State Military Navy Archive [RGAVMF], Posluzhnoy spisok Leifert Leonid Abramovich, 1926–1928, f. P 1530, op. 6, d. 106, p. 2.

a worker, and then had very quickly gone bankrupt[6]. According to him, his father died in 1900[7], but in any case, some money remained, since in 1902 the boy was successfully admitted to the Fourth or so-called Larinskaya Gymnasium, where by 1909 he had completed the required courses in the sciences.

Leonid was a good student. As his matriculation certificate indicates[8], his conduct as well as his performance in all subjects were assessed as 'outstanding', with the exception of his class in the Russian language, for which he was given a mark of 'good'. Immediately upon graduation, he submitted a request to be admitted to the mathematics department of the physics-mathematics faculty of St. Petersburg University, where he was automatically enrolled, in keeping with the privilege of all gymnasium graduates. In 1914, he passed the state exams and graduated from the university. His surviving student notes indicate that he attended and passed the following courses: analytic geometry, introduction to analysis, differential calculus, spherical trigonometry, descriptive astronomy, physics of partial forces, chemistry, crystallography, abstract algebra, applications of differential calculus to geometry, integration of functions, application of integral calculus to geometry, optics and acoustics, elliptic functions, statics, and kinematics. Leifert received the grade of 'very satisfactory' on all exams. The record also lists other courses (their names are printed), but no exam grades for them are given, so it may be supposed that Leifert did not attend them – as, for example, the course on the calculus of finite differences, taught by then-docent Gunter, whom Leifert was to have dealings with later on. The record likewise indicates certain courses that offered practice exercises – in analytic geometry, in differential calculus, in the application of differential and integral calculus, and separately, in the application of integral calculus to geometry. Judging by the fact that these course titles are written in longhand, it may be supposed that Leifert attended these courses, but that no exams in them were given.

During the time of his studies, in 1913, Leifert entered into lawful marriage with Marta Ivanovna Kobbel', a petty bourgeois resident of the city of Narva. But perhaps no less important was the fact that in 1912, he submitted a request expressing his desire to embrace the Christian faith according to Russian Orthodox custom. The sacrament was administered, as a surviving document attests[9], and from then on Leifert indicated his religion as 'Russian Orthodox' on official

[6] Tsentralnyi gosudarstvennyi arkhiv Sankt Peterburga – Central State Archive of St. Petersburg [TSGA SPb.], Lichnoe delo prorektora po khozyaistvennoy chasti instituta Grazhdanskikh inzhenerov Leiferta Leonida Abramovicha, n.d., f. 4398, op. 1, d. 1700, p. 1.

[7] In the address directory *Ves' Petersburg* [All of St. Petersburg] from 1910, A.P. Leifert is indicated as residing at the same address as that indicated by Leonid Leifert upon entering the University.

[8] TSGIA SPb., f. 14, op. 3, d. 55122.

[9] TSGIA SPb., f. 14, op. 3, d. 55122, p. 4, 39, 42.

forms, and later, in Soviet documents, when asked to state his nationality, he tended to answer 'Russian'[10].

He began teaching as early as 1913, at first at the Pokrovsky evening courses, and then at a certain Commercial Academy. The war was going on, and in 1915 Leifert was conscripted into the army and spent some time, as he wrote, as a soldier of the imperialist army, serving in the garrison artillery in Revel (Tallinn)[11]. He did not have to fight in any battles: he spent time in the training unit and was promoted to the rank of junior feuerwerker, then became a senior feuerwerker, and subsequently was transferred to the intendant department and became a junior clerk[12]. It seems that his service was not especially burdensome; at least, already in 1917, as a serviceman of a low rank, he was hired as an adjunct instructor at a women's gymnasium. Here, already after the February revolution, with the participation of the Revel fleet committee, he established a public university in Revel, according to his own account, and became its dean, and subsequently its director. The Revel Soviet demobilized him (again, according to his own account). In his autobiography[13], Leifert did not forget to relate that he was thrown out of the women's gymnasium because he demanded that the teaching of Scripture be abolished. In the confusion following the overthrow of the tsar, Leifert made a mistake, which he later had to report in official documents: in July–August 1917, he was a member of the Popular Socialist Party[14]. This was something like a wing of the far larger Socialist Revolutionary Party – the most influential party in Russia at the time – which, however, rejected the use of terror. In any case, these were not Bolsheviks, who in October 1917 took over the government. Shortly thereafter, Revel was captured by the German army, and Leifert fled to Petrograd (St. Petersburg).

Leifert's life in St. Petersburg: a basic outline

It was in St. Petersburg (more precisely, Petrograd and Leningrad, as the city was called at the time) that Leifert spent the years that brought him fame. His work was varied. By the middle of 1919, he had served as secretary of the cultural-educational department of the Second Municipal District, as emissary of the department of secondary educational institutions of the Commissariat of Public Education of the Union of the Communes of the Northern Region, and as head of a labor school (the former Pokrovsky women's gymnasium). In August 1919,

[10] TSGA SPb., Lichnoe delo dekana I otdeleniya Rabochego universiteta Leiferta Leonida Abramovicha, n.d., f. 6276, op. 245, d. 59, p. 1.

[11] TSGA SPb., f. 4398, op. 1, d. 1700, p. 1, p. 16.

[12] RGAVMF, f. P 1530, op. 6, d. 106, p. 28.

[13] TSGA SPb., f. 4398, op. 1, d. 1700, p. 16.

[14] RGAVMF, f. P 1530, op. 6, d. 106, p. 21.

he entered the Communist Party[15] and began teaching political literacy at the first infantry command courses; in September, he was already teaching the second infantry courses. In October, he entered a special forces unit as a rifleman, and during the same month, according to his account, took part in battles against the White general Yudenich, who was advancing on Petrograd; but later in the same month, the unit was dissolved, and Leifert went back to teaching political literacy. This is what he continued doing, in different locations, until 1921, when he left his position in the armed forces to become a professor of mathematics at the Estonian Pedagogical Institute (such an institution existed). Here, he additionally became the head of the political education section at the Political Department in Petrograd Higher Education Directorate (although the position he held there is indicated by him under different names in different documents, and Leifert did not occupy it for long). In August 1922, he began teaching mathematics at the Higher Military Pedagogical School. Finally, in 1923, he became a staff instructor at the Military-Naval Engineering Academy, where he worked until 1927, having occasion to take part in training cruises and becoming a naval lieutenant commander[16]. This was not his only employment. In July 1923, he also became a deputy rector of the Institute of Civil Engineers (and retained this position until 1926), and in January 1924, he became an associate professor at the mathematics department of the University. We pass over his other duties, which, according to his account, included being elected a member of the Petrograd Soviet in 1920, serving as head of the political department at a school, and so on. In 1927–1928, he served as dean and rector of the so-called workers' universities of the Regional Soviet of Labor Unions; in 1930–1932, he served as department chair at the Pedagogical University, and so on, and so forth[17].

Such a burden was nothing out of the ordinary at the time. First of all, the organizations that sprang up and the positions they made available were ephemeral – they could disappear very quickly. And second of all, to survive on just one job and just one ration was difficult, and Leifert, as he reported in an official form from 1928, had a twenty-five-year-old wife, Anna, and a six-year-old son, Stepan[18].

At the same time, the workload in certain of Leifert's jobs was substantial. At the Institute of Civil Engineers, although he did teach mathematics, Leifert's main job was being a deputy rector in charge of management and a member of the institute's board of directors. When the rector of the institute, Grigory Peredery (1871–1953), a quite well-known engineer who later became an academician,

[15] TSGA SPb., f. 4398, op. 1, d. 1700, p. 16.
[16] TSGA SPb., f. 4398, op. 1, d.1700, p. 16; RGAVMF, f. P 1530, op. 6, d. 106, p. 21–22.
[17] Private collection, L.A. Leifert, *Avtobiografiya*, n.d., p. 1–2.
[18] TSGA SPb., f. 6276, op. 245, d. 59, p. 1.

was away, Leifert remained as the acting rector (see decree of 11 April 1924[19]). And yet, from a certain moment on, the University became his main place of employment, and citing his duties there, Leifert gave up teaching at the military-engineering academy. The attestation certificate he received upon resigning described him as 'one of the few representatives of the left-leaning professoriate at the academy'[20]. This was also his role at the University.

On the Leningrad mathematics front

A book with this title (*Na leningradskom matematicheskom fronte*), published in 1931, summed up the struggle between the 'left-leaning professoriate', headed by Leifert, and their 'right-leaning' adversaries[21]. We will address the vicissitudes of this struggle below, but first we will turn to the most natural question, namely, what was it that Leifert taught?

Probably, his main course was analytic geometry. A lithographed set of lectures has survived[22] – partly typewritten, partly written by hand – and it was this course that Leifert himself always indicated as the most important example of his scientific production.

The course, as its author himself writes, undoubtedly makes use of the textbooks available at the time, say, of the repeatedly reissued course by Professor Ermakov[23]. As Leifert explains, the course was intended for 25–30 two-hour lectures and consisted of two parts: plane geometry (basic concepts, the line in the plane, quadratic curves), and spatial geometry (spatial coordinates, the plane and the line, quadratic surfaces). It should be said that today, a large part of the contents of this course is presented in school textbooks, and in fact, more concisely (the book has almost 300 pages). At the same time, I have not been able to identify any mistakes in Leifert's exposition, which, however, is not enough for Leifert to be considered a leading scholar.

But he was undoubtedly a leading member of the mathematics faculty, 'leading the struggle for the party orientation of mathematics, for the governing role of Marxist-Leninist methodology in it'[24]. Nor does he himself omit to mention his own role, relating that already

> During the 1922/23 academic year, a left-leaning professoriate group was organized in Petrograd, which chose from among its members a committee for investigating

[19] TSGA SPb., f. 4398, op. 1, d. 1700, p. 22.

[20] RGAVMF, Lichnoe delo Leifert Leonid Abramovich, n.d., f. P 2192 op. 2, d. 4256, p. 22, 25.

[21] *Na leningradskom matematicheskom fronte*, ed. by L.A. Leifert, B.I. Segal, L.I. Fedorov, Gosudarstvennoe sotsial'no-ekonomicheskoe izdatel'stvo, Moscow–Leningrad 1931.

[22] L.A. Leifert, *Analiticheskaya geometriya*, LGU, Leningrad, 1929.

[23] V.P.Ermakov, *Analiticheskaya geometriya*, pt. 1–2, Tovarischestvo I.N. Kushnerev and K°, Kyiv 1903–1907.

[24] *Na leningradskom matematicheskom fronte*, p. 3.

> the work of the physics-mathematics faculty of Petrograd University. This committee consisted of five professors from Petrograd educational institutions (A.G. Val'ner, N.P. Kamenschekov, K.A. Krzhishkovsky, L.A. Leifert, and A.P. Pinkevich).[25]

The committee brought to light the problems and factions that subsequently revealed themselves:

> Almost from the very first phases of work, and all the way until 1928, the mathematics subject committee broke up into three quite stable and rigid factions: a right-leaning group (N.M. Gunter, V.I. Smirnov, G.M. Fikhtengolts, and others), a left-leaning group (L.A. Leifert, A.D. Drozd, A.R. Kulisher, and others), and finally, an intermediate faction, less stable than the extreme ones (I.M. Vinogradov, A.M. Zhuravsky, and others).[26]

The right-leaning group – above all Gunter, who was elected as a corresponding member to the Academy of Sciences in 1924 and who headed the Leningrad Mathematics Society, and Smirnov, who became a corresponding member in 1932 and an academician in 1943 – were accused of ignoring the challenges of socialist construction, adhering to formalist viewpoints, and contending that 'the essence of mathematics consists in its freedom', that mathematics was only an 'apparatus', which could not be either idealist or materialist, and so forth.

It must be noted, however, that left-leaning party comrades were also not without flaws. A.D. Drozd was accused of publishing a text, *Elementary Mathematical Analysis*, 'of a character that discredited dialectical materialism'[27]. Leifert's preserved party documents indicate that he was disciplined for squabbling (with the same Drozd)[28].

In general, party members did not hesitate to discredit one another. At a meeting in 1928, whose subject was 'Relations Among Party Members', one of the members of the local party organization spoke about Leifert as follows:

> Our arguments with Leifert began in 1925 […]. We disagree with Leifert, first of all, because he considers us idiots. While discussing the possibility of making Smirnov a leader of a math circle, he called us idiots. I emphasize this especially […]. Leifert compared himself to Stalin, who today is fighting with Zinoviev and Kamenev, and later will fight with Rykov and Kalinin. These fundamental differences, in my opinion, are merely a front. He fights against communists, professors, because he considers himself to be the smartest, and also because some people stand in the way

[25] Ibidem, p. 10.

[26] Ibidem, p. 10.

[27] Ibidem, p. 20.

[28] Tsentralnyi gosudarstvennyi arkhiv istoriko-politicheskikh dokumentov Sankt Peterburga – Central State Archive of Historical–Political Documents of St. Petersburg [TSGIA IPD SPB], Leifert Leonid Abramovich, n.d., f. P-1728, o. 1, d. 657846.

> of his career. He wants to entrench himself as a dean […], we differ with Leifert on the question of the contents of mathematics. He has crippled us with his course, "Encyclopedia of Mathematics".[29]

We should note, in addition, that Leifert's party documents also contain a denunciation written in 1928 by a certain Yefremov, which relates that after becoming acquainted with Leifert in 1917 at courses that Leifert supervised, the accuser heard from Leifert words of criticism against the Bolsheviks, who, according to his statements, wished to confiscate land from the landowners without paying for it, as well as words of sympathy for the Kadets (members of the Constitutional Democratic Party) and their leader, Miliukov, and for the Narodniks. Additionally, the document for some reason reports that Leifert was unwell and complained that he could not go anywhere after eating[30]. Leifert's file was then sent to the Vasileostrovsky Supervisory Committee, but the committee evidently reached the conclusion that the accuser was not credible, and the investigation was dropped without consequences.

The case of Gunter and the Leningrad Mathematics Society, however, was carried out to the end. Gunter was forced to publish a letter in the "Leningradsky Universitet" newspaper, which included the following statement:

> The life of our country is moving forward so rapidly that many are forced to rethink their former activities and seriously reevaluate them. For my part, already a year ago I saw that I had committed significant mistakes. I consider my main mistake to have been that, while serving as chair of the Physics-Mathematics Society, I was unable to establish connections between its activities and the needs of socialist construction, so that the Society effectively remained entrenched in the old viewpoint of "science for science's sake".[31]

The Society was closed.

The Russian mathematician V.M. Babich offers a simple explanation for the struggle that was taking place: 'The indignation of the left-leaning faction was provoked by V.I. Smirnov's efforts to have college mathematics departments be chaired by qualified people with academic degrees and scientific works'[32]. Leifert, we should point out, went at it from the opposite direction as well, trying to obtain an academic degree himself: in 1930, he submitted an application to the graduate school of the Communist Academy on the methodology of the natural sciences[33].

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[29] TSGIA IPD SPB, Protokoly soveschanii fraktsii VKP(b) i sobranii chlenov i kandidatov VKP(b) otdelenii fisiko-matematicheskogo fakul'teta, 1928, f. P-984, op. 1, d. 341.

[30] TSGIA IPD SPB, Leifert Leonid Abramovich, f. P-1728, op. 1, d. 657846.

[31] *Na leningradskom matematičeskom fronte*, p. 38.

[32] O.A., Ladyzhenskaya, V.M. Babich, *Vladimir Ivanovich Smirnov, 1887–1974*, Nauka, Moscow 2006, p. 154.

[33] TSGIA IPD SPB, Leifert Leonid Abramovich, f. P-1728, op. 1, d. 659246.

It should be borne in mind that by the end of the 1920s, the student body began to change, as the already cited publication *Na leningradskom matematicheskom fronte* [On the Leningrad Mathematics Front] indicates: 'Workers' faculties students[34] and the still small numbers of students of factory worker or peasant background who graduated from labor schools have begun reaching the upper grades of higher educational institutions and approaching their graduation'[35]. Leifert was very sensitive to what was happening, for example, he supported the merger of the University's physics and mathematics departments, explaining that this would increase the proletarian element and make it possible to clear the air for mathematics students, who were under the influence of right-leaning professors[36]. A former workers' faculty student would find it easier to deal with him, he clearly believed, than with abstruse theoreticians.

Leifert as a mathematics educator

All of Leifert's doings at the University discussed above effectively pertain to his work as a mathematics educator, but here we will describe what he wrote and did in connection with school-level teaching.

In our view, Leifert's article *Reforma prepodavaniya matematiki i revoliutsiya* [Mathematics Instruction Reform and the Revolution][37] is extremely indicative of his views. This article begins with a brief account of the work of the International Commission on Mathematics Instruction, with copious references to the chair of the Russian subcommittee, K.A. Posse. From this, Leifert transitions to the question of how mathematics should be divided up, now quoting from his own report, which has, unfortunately, remained inaccessible to us:

> In the era of bourgeoisie rule, mathematics was split into three parts: (1) The lowest or elementary part, studied in secondary schools by the lowest-ranking technically-trained workforce of bourgeois society; (2) The highest part, studied in higher educational institutions by the future upper command personnel of this society; (3) The very highest part, which examined topics of a higher order, in most cases already connected with philosophical topics and representing the privilege of the learned caste of bourgeois society. The learned caste examined these topics only in scientific literature, in their scientific societies, and so on, without even presenting them to university faculties. For a certain time, such a system was completely satisfactory for the old society.[38]

[34] Graduates of so-called workers' faculties – special preparatory courses for people of factory worker or peasant background.

[35] *Na leningradskom matematicheskom fronte*, p. 13.

[36] TSGIA IPD SPB, Protokoly soveschanii, f. P-984, op. 1, d. 341, p. 2.

[37] L.A. Leifert, *Reforma prepodavaniya matematiki i revoliutsiya*, "Prosveschenie. Pedagogicheskii sbornik" 1923, no. 3, p. 218–225.

[38] Ibidem, p. 219.

The last point is immediately explained: technology demanded new methods of research; but to allow the idea of movement in secondary schools, thereby awakening the critical spirit, was something that the bourgeoisie, of course, did not want; therefore, it fed the masses the scholastic formalism of *The Elements*. As for such foundation-shaking works as the geometry of Lobachevsky, they could be entrusted only to very narrow circles (we paraphrase very closely to the text).

Leifert praises Perry and even more so Klein, but at once notes: 'However, the work of F. Klein himself shows that it is not so easy in a bourgeois society to introduce into secondary schools the methods with which scientists operate', and further:

> while materialist elements in philosophy were a reliable weapon against feudalism, with its commitment to scholasticism, as the struggle against the proletariat begins to fill the whole public life of bourgeois society, the latter recoils in horror from the conclusions of the natural sciences, which it itself developed, and seeks to hide under the wing of idealist philosophy.[39]

Hiding behind this philosophy, the bourgeoisie supports the cult of pure mathematics in schools, insisting on logic to the detriment – as one may conclude – of practical activity.

'Thus', Leifert concludes, 'the questions of reform, as they are posed by Prof. Klein, […] go beyond the boundaries of "reform" and become transformed into "revolution" in bourgeois society, for they infringe on the very foundations of the bourgeois view of mathematics, its subdivisions, objectives, and methods'[40].

It is all but self-evident that, relying on thousands of evangelists and 'pure scientists', whom it has transformed into a kind of priestly caste, the bourgeoisie is attempting to forestall such a revolution. Leifert concludes almost in the style of *The Communist Manifesto*:

> Only the proletarian revolution, which liberates science, making full use of it for the purpose of developing technology and looking material needs openly in the face, will accomplish the tasks envisaged in the depths of old social forms.[41]

The International Commission is also referred to in the already cited book *Na leningradskom matematicheskom fronte*. Here, Leifert begins by developing ideas that initially seem quite comparable to the ones expressed earlier:

> The main objective of the reforms was to endow mathematics instruction as a whole with a more practical character and to abolish that rift between elementary and so-called higher mathematics which was so characteristic of the eighteenth and nineteenth centuries.[42]

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[39] Ibidem, p. 223.
[40] Ibidem, p. 225
[41] Ibidem, p. 225.
[42] *Na leningradskom matematicheskom fronte*, p. 6.

This is followed, however, by a criticism of the members of the Russian subcommittee of the International Commission on Mathematics Instruction. Leifert explains that the outcome of the work of the so-called delegates to the commission (the presidium, as it is referred to in the book) 'was a slowing down of that movement in favor of reform which was underway in Russia, too, among some secondary school teachers and a small number of associate professors and assistants at institutions of higher learning'[43]. Leifert identifies different political groups among supporters of the reforms, from civil servants who were brought up on 'Kiselevschina' (that is, the popular textbooks of Kiselev) to politically left-leaning individuals, who usually did not go beyond sympathizing with the Mensheviks and the Socialist Revolutionaries (political parties that were considered leftist, but hostile to the Bolsheviks). In his assessment of them, Leifert writes resolutely:

> This essentially ragtag left wing of the mathematics community consisted of a workforce ready to conduct liberal reforms in the spirit of the leading bourgeois schools of Europe. But the rottenness of the Russian bourgeoisie, its inability to achieve reforms even in the area of public education against the power of a semi-feudal tsarism, revealed itself in the fruitlessness of the work of this "left-leaning" group of mathematicians as well, who were only able to express their dreams and desires in literature, and only in a very few schools, which at least partly implemented the envisioned reforms.[44]

Serious transformations, as Leifert goes on to explain, became possible only after the October Revolution.

It was Leifert's desire to contribute to such transformations in his main methodological composition, *Metodika matematiki dlya pedagogicheskikh tekhnikumov* [The Methodology of Mathematics][45]. This book was written by a group of authors, referred to as a 'brigade', with Leifert, accordingly, acting as its foreman. He himself wrote only the first chapter, "Historical-Methodological Introduction", but the preface enunciates a certain general collective responsibility for the volume as a whole, and therefore, we should say something about the book as a whole as well. Its last four chapters are devoted to teaching mathematics during the first, second, third, and fourth years of school and are filled with practical examples, while its first three chapters are devoted to general questions of methodology. The introduction, which in our view was written by Leifert himself, with his usual belligerence, contains the following passage:

> In the context of a fierce class struggle and covert resistance against the polytechnization of schools on the part of some of the "authorities" in the field of mathematics, who make every effort to prevent the inclusion of mathematics in the arsenal of weap-

[43] Ibidem, p. 7.

[44] Ibidem, p. 9.

[45] *Metodika matematiki dlya pedagogicheskikh tekhnikumov*, ed. by L.A. Leifert, OGIZ, Moscow–Leningrad 1931.

> ons available to communist education by invoking "apoliticism", the impossibility of confining a textbook on the methodology of mathematics to the mere communication of "technical suggestions" and "recipes" for instruction, as was often done in older textbooks, has become especially clear. The authors' brigade has deliberately included a sufficient share of methodological and foundational material, which in its opinion must play a certain revolutionizing role in the enterprise of mathematics instruction and facilitate the elevation of the basis of its teaching in the USSR to a level that is at least to some degree sufficient for accomplishing those great tasks which have been put forward by the cultural revolution.[46]

Consequently, the introduction acclaims the main and only recommended method of teaching, namely, the complex-based method[47]. According to this method, mathematics should not be studied as a separate subject; rather, it should appear alongside other areas of science and their practical applications in the process of unified labor-based activities. The book's third chapter, devoted specifically to how such 'complexes' should be constructed, lambasts I.N. Kavun's textbook *Trud v chislakh* [Labor in Numbers], for example, 'in which the participation of mathematics in various projects is based on a completely different schema, namely: first, the whole theoretical part; then, the practical part. First, an infinite number of abstract examples; then, practical problems'[48]. This is wrong. The right way to do it, for example, is the way that is recommended in the sixth chapter: the children are to be engaged in useful tasks – for example, 'task 6: organize a collective campaign against pests in flower gardens, vegetable gardens, fields, and show that such work may be most easily conducted collectively and in collective flower and vegetable gardens'[49]. To this end, the children prepare diagrams, which indicate that pests eat more bread than peasants, let alone workers; uncover the sinister role of mice; determine, by inspecting a sample plot, how much grain mice will destroy there (while taking into account the growth of the mouse population); design birdhouses for tits, who destroy the pests, and so on.

But Leifert himself wrote about other, more elevated matters. He begins by inveighing against idealist philosophy and asserting dialectical materialism as a foundation.

> "After all, two times two equals four both for the bourgeois and for proletarian": such arguments are used by both scientists and ordinary citizens to confuse young people unfamiliar with the questions of methodology. But the question is not whether two times two equals four or not: the question is whether the abstract number two is

[46] Ibidem, p. 3.

[47] See A. Karp, *Soviet mathematics education between 1918 and 1931: a time of radical reforms*, "ZDM-International Mathematics Education" 2012, vol. 44, no. 4, p. 551–561; A. Karp, *Reforms and counter-reforms: Schools between 1917 and the 1950s*, p. 43–85.

[48] *Metodika matematiki dlya pedagogicheskikh tekhnikumov*, p. 65.

[49] Ibidem, p. 167–168.

> a creation of the human spirit or a real relation between concrete things and processes, and what is the relationship of mathematical concepts to reality in general?[50]

This is what determines the direction in which we lead the child. Philosophical aspects of the understanding of the nature of numbers are discussed. The political significance of how we work with numbers is also laid bare:

> "The little game of numbers" – this is how Lenin referred to excessive attempts to mathematize class stratification in statistics and to hide it behind numbers. This little game of numbers and graphs goes on to this day, especially in America, where curves and convoluted mathematical computations have been used to attempt to prove the robustness of "prosperity". To be sure, our own saboteurs, entrenched in our planning and statistics agencies, have also used convoluted mathematical formulas and graphs for their own, unequivocally destructive purposes.[51]

Further, Leifert turns to a discussion of the three parts of mathematics that he had identified, and tells about reforms. Here, he practically repeats his own compositions, already cited above, and somewhat unexpectedly brings up the debates between the formalists and the intuitionists, which, one would think, have little relation to teaching in elementary schools. Nonetheless, this section concludes as follows:

> The project or complex-based system of working, which ties mathematics into the whole enterprise of working with the concrete materials of reality, does not narrow mathematical work down and does not go against the methodological aims of mathematics as a science. Mathematics as a science itself, through the work of its most prominent representatives, has disclosed the inadequacy of the system that cuts mathematics off from the other sciences as a "special, self-contained, and not self-contradictory system".[52]

Nor is the class struggle in mathematics and its teaching passed over in silence. Gunter and other 'right-leaning' mathematicians are not forgotten. The article mentions just one specifically mathematical activity, based on a pretty moving situation: children, sent on a school event, are promised one glass of tea each, if they each bring their own candy (as a result, in the course of the exercise, there are opportunities to practice some addition and even multiplication by two, since a further glass of tea is offered on the same condition). In conclusion, readers are told about the role of technology, which should be augmented in every way possible, and of course about the fact that only under the party's leadership can all the necessary changes be brought about.

[50] Ibidem, p. 7.
[51] Ibidem, p. 12
[52] Ibidem, p. 27.

Leifert's last years

Metodika matematiki dlya pedagogicheskikh tekhnikumov was published in 1931, but in the same year catastrophe struck. The party decided to follow the path of industrialization, and for this, it was necessary to teach differently from the way preached by Leifert. The Central Committee of the Communist Party began to issue resolutions pertaining to education[53], which condemned 'left-leaning perversions', including the complex-based approach. Leifert hastened to join the new ranks, and in his paper of 1932, he wrote:

> This resolution strikes a blow first of all against frivolous methodological fantasizing, which imposed methods previously untested in practice (for example, the project-based method) on a mass scale, and also against that deindividuation of academic subjects which undoubtedly took place both in beginning and in higher schools, which based their work exclusively on the complex-based system.[54]

To the word 'fantasizing' he attached a footnote: 'such fantasizing was surreptitiously encouraged by the textbook *The Methodology of Mathematics*, published under my editorship in 1931'.

But this did not help. Soon, Leifert was relieved of his duties. Ermolaeva (1998) quotes from the archives of the Academy of Sciences: it turned out that Leifert had 'merely used dialectical materialism as a cover', that he had carried out a 'superficial critique of the approach of bourgeois mathematicians', and that he had in fact not done any work at all, with the exception of publishing the pamphlet *Na leningradskom matematicheskom fronte*, 'whose content offers a soil that is quite barren from an ideological point of view', etc.

In his autobiography[55], Leifert told that in 1933 he was transferred to the position of professor and chair of the mathematics department at the Rostov pedagogical institute, a year later was confirmed in the post of acting professor, and later still, in 1935, was confirmed in the post of graduate school chair. In 1936, Leifert published a paper on proportions and their use in solving linear equations, that is, on a topic that had previously been completely foreign to him[56]. But there was no longer any time or possibility for him to reconstruct himself. Leifert moved to Voronezh, where a new pedagogical institute had opened. We know about this, as also about his Rostov period, only from certain accounts[57]

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[53] See A. Karp, *Soviet mathematics education between 1918 and 1931*; A. Karp, *Reforms and counter-reforms: Schools between 1917 and the 1950s*.

[54] L.A. Leifert, *Nekotorye voprosy prepodavaniya matematiki v FZS (fabrichno-zavodskoy semiletke)*, "Fizika, khimiya, matematika, tekhnika v trudovoy shkole" 1932, no. 2, p. 49.

[55] Private collection, Leifert Leonid A., *Avtobiografiya*.

[56] L.A. Leifert, *Kratnye otnosheniya i proportsii i primenenie ikh svoistv k resheniiu lineynykh uravnenii*, "Fizika, khimiya, matematika, tekhnika v trudovoy shkole" 1936, no. 5, p. 11–14.

[57] N.Ya. Vilenkin, *Formuly na fanere*, "Priroda" 1991, no. 6, p. 95–104.

that we cannot confirm or refute. In April 1938, he was executed. The historical section of the St. Petersburg University website cites the charge as being right-wing, Trotskyist activity; Vilenkin contends that he was executed for connections with individuals linked to Bukharin, with whom he supposedly associated at the Communist Academy. There is no contradiction here – Bukharin's own trial was labeled as a 'case against the anti-Soviet, right-wing, Trotskyist block'.

Discussion and conclusion

Leifert was no research mathematician, of course, but he was not altogether illiterate either – if he had been a school teacher, he would have been no worse than anyone else. But what he wanted was to remain outside any school. There exists a substantial literature about mathematicians who made it their business to teach teachers how and what they should do, but the reverse also occurred: mathematics educators wanted to exercise control over mathematicians.

One may wonder to what extent Leifert himself believed in 'red integrals'. The author of this paper is of the opinion that he did so no more than he believed in the holy sacraments of the Russian Orthodox Church, which he had joined as a convert. V.M. Babich, already cited, wrote that 'these were careerists altogether unburdened by mathematical talents, who believed that control of university departments and other key positions needed to be in their hands'[58]. What is worth noting, however, are the ideological instruments they employed in their struggle for power.

Naturally, these featured the usual Soviet phraseology about the struggle against the putrescent bourgeoisie. But there was also room enough to include the principles of the reform movement, although it was immediately pointed out that Klein did not understand the political side of the issue. The idea of a confluence among subjects, which brings to the table not experts in any one subject, but experts 'in general', who are permitted not to prove theorems, and not to make biological observations, also turns out to be very useful. Today's mathematics educators will be especially delighted to learn that the struggle to make use of technology was also promoted, although the technology in question at the time was no more than an innocent slide rule.

There is yet another side to the issue. The state needed people like Leifert, who were ready to serve faithfully and loyally, but in time it turned out that the state also needed something else: the armor had to be strong and the tanks had to be swift, as a popular song of the time went, while the idea that the most advanced science had to merge with the most elementary, that is, that university administrations and academies should be filled only with people who were not themselves scientists, could not help in making tanks. Thus, it turned out that the 'left-leaning' activists of the mathematics front were pushed aside (some of them, indeed,

[58] O.A. Ladyzhenskaya, V.M. Babich, *Vladimir Ivanovich Smirnov, 1887–1974*, p. 155.

executed), while the 'right-leaning' Smirnov had to be respected and honored. There was a complicated combination of a struggle for power and the realities of life, and those in power were forced to maneuver between them.

One could name numerous individuals who might appear to have been far guiltier than Leifert, prepared as he was to do anything to make himself useful to those in power, but who survived and even thrived. There is no point in looking for precision and logic in murders. We would merely remark that the state usually did not stand on ceremony with those who served it. Leifert, as we have seen, permitted himself to compare himself with Stalin. These words were forgotten, of course, but this type of revolutionary – even a revolutionary who was not real, a fake revolutionary – turned out to be unwanted.

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