

**SOME CLARIFICATIONS ON THE HISTORY OF RUSSIAN
MATHEMATICS OF THE 20TH CENTURY
(APPENDIX TO A. PAPADOPOULOS' ARTICLE)**

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In this note, I would like to bring a few additions that clarify some points in A. Papadopoulos's article related to the biographies of P. Florensky and N. Luzin. My additions may shed a different light on this complicated period of the history of mathematics in the Soviet Union.

According to B. Mlodzevsky, it was characteristic for Moscow mathematicians of the turn of the 19th and 20th centuries, "to explain mathematics through the worldview, and worldview through the mathematics" [8, p.185]. The leading role in this orientation of the Moscow school belonged to N. V. Bugaev, whose theory of discontinuous functions was considered in a philosophical context and had a wide resonance among Moscow mathematicians [4], although his colleagues did not appreciate his mathematical results and lectures [12, p. 165–185].

In 1897, at the First Congress of Mathematicians in Zurich Bugaev made a report *On the influence of mathematics on the worldview* [1]. According to him, world laws are explained in the language of the theory of continuous functions. This gave rise to determinism, while in the natural and human sciences many phenomena cannot be subordinate to the laws of mathematical analysis. Using continuity, only part of the world events can be explained. At the same time, a new science emerges from number theory, a theory of discontinuous functions, called arhythmology. In the realm of philosophy proper, arhythmology is refracted into monadology. The arhythmological point of view complements the analytical worldview. Combining both worldview approaches, analytic (using mathematical analysis) and arhythmological (using the theory of discontinuous functions), and adding probability theory in necessary cases, Bugaev obtains a scientific world view that allows us to explain mechanically world phenomena. Finally, whenever phenomena do not obey the correct laws, probability theory applies. From the cumulative application of all these departments of mathematics, a true scientific and philosophical outlook was formed.

N. Luzin and P. Florensky entered Moscow University with a difference of one year (1901 and 1900 respectively). They soon became friends. First a mathematics student and then a priest, Florensky was a very ambiguous figure. No doubt he was very talented. In his student years, he was fascinated by Bugaev's ideas. He then became interested in Cantor's set theory. Florensky was the first to publish a competent statement of Cantor's ideas in Russian (*On the symbols of Infinity*, 1904). But then his interests shifted towards theology. After graduating from university he entered as a student the Moscow Theological Academy. He needed mathematics only as a basis for building the philosophical foundation of the universe. His philosophical and religious works, *The pillar and foundation of truth* (1914), *Reverse perspective* (1919), *Imaginarie (imaginary numbers) in geometry* (1922) are widely known. In particular, in his last work, Florensky interprets the complex

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plane as a two-sided object for the rehabilitation of the Ptolemaic model of the Universe.

The statement that Florensky was extremely talented in mathematics is debatable. Luzin and his teacher D. Egorov estimated the mathematical success of the student Florensky low. In 1908, Luzin wrote to his wife about Florensky: “As soon as he showed his work in mathematics, again the old opinion began to stir in me: all his works have no value in the field of mathematics. Hints, beautiful comparisons are something that revels and promises, is tantalizing, alluring and ineffectual. And in the end I stopped understanding what Florensky is. Or is it a precursor of the new, the petrel, or a capable person with subconscious hellish self-love, who, because of the desire to be the best of all, has retired here? [7, p. 150].

In 1904–1907, Luzin experienced spiritual crisis which was so severe that he wanted to stop practicing mathematics, and even wanted to take his own life. One reason for the crisis was the dramatic atmosphere that preceded the first revolution. His teacher Egorov hastily sent Luzin from Russia to France to prepare him for professorship. At this time, Luzin was under the strong influence of Florensky. On the ambiguity of Florensky’s personality and his negative charisma, L. Sabaneev wrote in his memoirs (1915): “Very black and very thin, for some reason he always looked down and slightly sideways, he did not like to show his eyes. He never smiled. It was a strange thing—he had many students, apparently, he taught them not only classical theological subjects common to the spiritual sciences, but also gave them esoteric knowledge and habits. Three of his students committed suicide—powerful vibes emanated from him, and I myself felt it, felt that not all fluids were good, there were very demonic among them. I don’t remember exactly who, but speaking of him, one of the Russian ‘neo-Christian’ group called him ‘a clever and cruel Lavra priest’. In any case, he was an absolutely extraordinary person, and I am very grateful to the fate that brought him together with me, although not for long” [11].

The relations between Luzin and Florensky were uneven and the influence of Florensky on the mathematical search for Luzin is problematic.

In 1915, Luzin presented his master’s thesis *Integral and trigonometric series*, with so strong results that it was qualified as a doctor’s thesis. Starting in 1917, Luzin began to teach at Moscow University, a group of talented students gathered around him. This circle was named Luzitania. It was a happy period of the relationship between a teacher and equally talented students. Years passed, the students themselves became leaders of scientific schools, and in the meantime, the Stalinist terror gained momentum in the Soviet Union. Trials began, the search for “enemies of the people” was going on. Under the blow was the intelligentsia, the old professorship. Much has been written about this in Russian literature. The Soviet government sought to subjugate the Academy of Sciences, to “domesticate” the old scientists, orienting them to the tasks of communist construction, re-educate Soviet scientists in the spirit of communist ideology. For this, any contradiction among scientists was used. The conflict between Luzin and his former disciples in 1936 served as a convenient pretext. About this tragic story, see above all [2].

Despite this fact, it is impossible to perceive the persecution of Luzin as a direct manifestation of Stalin’s terror. It was part of a more general process. Stalin did not set himself the goal of punishing Luzin and did not even know about the beginning of the persecution. The reason was different: the happy period of Lusitania ended, the former disciples became independent scientific leaders, and rivalry began. A tangle of very complex contradictions both in the mathematical community and in society as a whole, multiplied by the difficult character of Luzin, who in his

own way understood his role in the students' successes; denunciations written on Luzin by the pro-Communists E. Kolman and V. Molodshij; the clash of traditional ethics of old scientists with the new ethics of the younger scientific generation; the atmosphere of fear cultivated among the intelligentsia by the Stalinist search for "enemies of the people": all this inspired this persecution. The case was accompanied by violent attacks on Luzin in the newspapers. Nevertheless, it did not go beyond the academic environment, and a month later it was completed by the *Decree of the Presidium of the Academy of Sciences of 08/05/1936 on Academician Luzin* with the following wording: "Given the importance of N. N. Luzin as a major mathematician, and weighing the full force of social impact, what had revealed in such a broad, unanimous and fair condemnation of the behavior of N. N. Luzin, and based on the desire to give Luzin the opportunity to restructure his whole behavior and work, we consider it possible to limit the warning to N.N. Luzin that in the absence of a decisive change in his future behavior, the Presidium will have to urgently raise the question of expelling N.N. Luzin from the academic ranks" [3].

Luzin escaped the terrible machine of Stalin's repression, which many well-known scientists got into, including Florensky who was shot in 1937. See also (in Russian) S. Novikov (Jr.) [10], a very deep study of Yu. Neretin [9], and (in English) A.E. Levin [5]. Luzin recovered with difficulty after the persecution, he was ill for a long time, then continued his scientific work, but he no longer made major discoveries.

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