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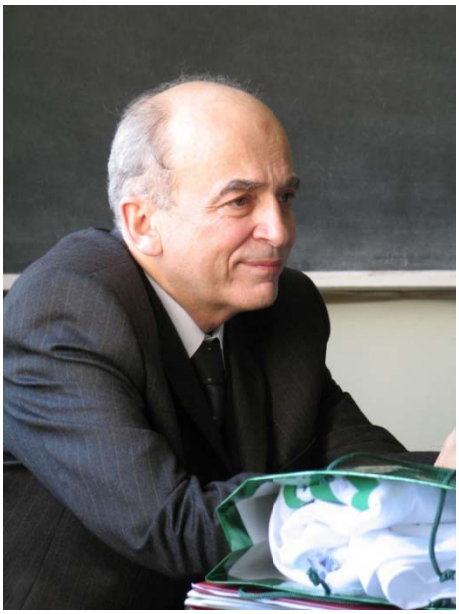
studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 3:1 (2014), pp. 48—50
DOI: 10.2478/sh-2014-0005

Is Russian Mathematics Promising Still?



Semën Kutateladze is a Russian mathematician who has continued and enriched the scientific tradition of Leonid Kantorovich. He works at the Sobolev Institute of Mathematics of the Russian Academy of Sciences and Novosibirsk State University and known for contributions to functional analysis and its applications to vector lattices and optimization. In particular, he has made contributions to subdifferential calculus for vector-lattice valued function, to whose study he applied the methods of Boolean-valued models and infinitesimals.

Andrew Schumann: Soviet mathematics had one of the best traditions, and the results by Soviet mathematicians were accepted all over the world. Why did Soviet mathematics become so successful? The Soviet totalitarian system cannot be considered the best context for any scientific activity. Which fields of Soviet mathematics were best developed?

Semën Kutateladze: This is a topic for a special monograph, and so I answer superficially. We should distinguish between the terms "Soviet mathematics" and "Russian mathematics." The latter implies mathematics that is produced by those who think in Russian. There was no Soviet language and mathematics in the USSR was part of Russian mathematics. No one calls Euler a Russian mathematician. Mathematics was successful in the USSR mainly by the special ideological role of science. Theoretically, socialism was viewed as a science, and scientists had privileges in the USSR. For instance, each full member of the Academy of Sciences had the salary that exceeded the salary of a member of the Political Bureau of the Communist Party. A gifted mathematician could become an academician in his prime years. So mathematics was a path to some freedom in the stale totalitarian atmosphere. Russian mathematics in the times of the USSR had contributed to practically all areas. It is sufficient to list the names of world-renowned late celebrities: N.N. Luzin, P.S. Novikov, A.N. Kolmogorov, S.L. Sobolev, A.I. Malcev, L.V. Kantorovich, A.A. Markov, A.D. Alexandrov, V.I. Arnold, O.A. Ladyzhenskaya, and many others.

Andrew Schumann: Is Russian mathematics of today is promising still?

Semën Kutateladze: In my opinion, it is still promising but the schools are being dispersed and mathematics is not the business that makes you free in modern Russia. So, the vistas of mathematics in Russia are dim.

Andrew Schumann: Grigori Perelman who has proved the Poincaré conjecture and published this result not in a journal, but in *arxiv.org*, an open e-print archive, is the most eminent Russian mathematician today. Now he is a best-known sample of maths genius with a strange and unexplained behaviour. How far typical is his behaviour for Russian mathematicians? Mukhtarbay Otelbaev, a mathematician from Kazakhstan, has published a 100-page paper on the existence of strong solutions for the Navier-Stokes equations. His paper is printed in a journal that is not indexed in Web of Science or anywhere else and it is not the best place for such a result. It is quite strange too. How many maths geniuses who do not satisfy common standards of social activity in science can we expect in the post-Soviet countries? Why do we face these situations?

Semën Kutateladze: According to the last evidences, Mukhtarbay Otelbaev does not have a correct proof. Grisha Perelman is not strange at all. Grisha had opened his results to the community for checking, claiming nothing. Grisha is a *champion of scientific ethics* and an exemplar of the highest moral standards. The majority does not meet the standards and considers Grisha a freak. History lists many analogous human follies.

Andrew Schumann: In Russia the wide-ranging structural reforms in science have been started recently. Are they promising? How can they change Russian mathematics? Can h-index and other tools used now in the Russian science measure both the productivity and impact of the published work of a mathematician?

Semën Kutateladze: The reforms of science in Russia are conceived and implemented by professional reformists *per ce.* Those are bureaucrats who agree with nobody but themselves. The practical dissolution of the Russian Academy of Sciences will hamper science in Russia for decades. As regards the h-factor and its next of kin, suffice it to say that the International Mathematical Union has appealed to abstain from bibliometric indices in making any decision on the contribution and status of a fellow mathematician.

Andrew Schumann: You are both a mathematician and logician. The program of Berlin and Vienna Circle (the so-called Hilbert's program) as well as the program of Lvov-Warsaw School consist in reducing mathematics to logic. But this program became unsuccessful for different reasons. Do you think that a new program of reducing mathematics to logic is possible yet, e.g. are new logical tools possible in infinitesimal analysis?

Semën Kutateladze: Mathematics became logic in the twentieth century. But logic is understood today in a much broader context than in the times of the battle for the ultimate foundation which is viewed now as a wild-goose chase. Logic was a dogma yesterday. Logic is the fortress of freedom today. As regards new logical tools, these are galore not only in infinitesimal analysis.

Andrew Schumann: What is mathematical knowledge? Do mathematical objects exist? What are infinities?

Semën Kutateladze: Those are insurmountable questions and so my answer will be trivialities. Mathematical knowledge is a collection of very simple universal intellectual patterns. Our ancestors differed a cave from a hole − that is topology; they used cardinal and ordinal counts − that is set theory and algebra; they sought for trend and predict future − that is calculus and probability. We safeguard and develop their techniques. Mathematical objects are figments of thought. There are no logarithms, nor Lie groups without humans. But we are humans and we use these figments. An infinite is a number greater than any assignable number. For instance, the number of molecules in

the chair I sit now. The modern details of this ancient definition are revealed in the Robinsonian infinitesimal analysis.

Andrew Schumann: Please say about problems or theorems you are working on?

Semën Kutateladze: My current interests in mathematics consist mainly in finding some formalities that will unify the nonstandard models of set theory and simplify their use in analysis. I also dream of a new variational calculus suitable for multiple criteria optimization problems.