**V.A.Rokhlin --- the outstanding mathematician and person with extraordinary fate (a short biography of Vladimir Abramovich Rokhlin, 1919-1984)**

(The speech on the Opening session of the Conference “Topology, Geometry, Dynamics: Rokhlin-100, St. Petersburg, Russia,19-23.08.19.}

 *Introduction*

*I want to tell the story of the difficult and dramatic life of the talented person who lived overcoming all difficulties that occurred on his way and became one of the most famous mathematicians of the previous century.*

*First of all, I address young scholars who should know truth about that time and its heroes.*

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Vladimir Abramovich Rokhlin was born in Baku (the capital of Azerbaijan) on 23.08.19. His mother, Henrietta Emmanuilovna Levinson, originated from a well-to-do Jewish family of a businessmen who had arrived from Ukraine. She was a physician with a European medical education; a well-known writer Kornei Chukovsky was her stepbrother. She perished when V.A. was 4 years old. Perhaps it could be a murder during the epidemic disorder in Baku in 1923.

V.A.’s father, Abram Veniaminovich Rokhlin, was an economist and social-democrat who had irreconcilable differences with Bolsheviks. He was exiled to Kazakhstan in the 1930s and later was arrested and executed in 1942.

V.A. graduated with flying colours from high school in Alma-Ata when he was only 15 (he had skipped two classes). Despite obvious difficulties, he was accepted to Mathematical Department of Moscow State University (“mech-mat”) in 1935. According to his contemporaries, he was in the centre of the students’ attention and life of mech-math. His teachers and advisers were the best Soviet mathematicians. During his student years V.A. studied simultaneously set theoretical topology --- with Pavel Alexandrov, measure theory and dynamics --- with Andrei Kolmogorov, functional analysis --- with Israel M. Gelfand and Lazar Lusternik, group theory, algebra and topology --- with Lev Pontryagin, and operator theory --- with Abram Plesner, an immigrant from Europe. All of them suggested V.A. some problems and he successfully solved some of them and published in the student volume. All those mathematicians gave him recommendations for graduate school (“aspirantura”) under their supervision.

His first significant paper co-authored with A. Plesner was focused on spectral theory of operators in Hilbert spaces, and was written in 1940 and published in “Uspekhi” 1946, v1:1, (120 pp.) when V.A. was in imprisoned in the camp (see below).

The second big survey “Homotopic groups” also had been written earlier but was published several months later in the same volume of “Uspekhi” 1946, v1:5-6 (48 pp.) But at that time he had already been released. I do not know other cases when a student published two big surveys in the best mathematical journal of the country and was in prison at the time of publication.

At the beginning of the war (1941) V.A. was a first year graduate student, yet he did not want to evacuate, so he decided to join a volunteer corps that was not a part of the regular army (so-called “opolchenie”).  Many untrained, badly equipped youth without any military background were thrown by the Soviet power into the fire of war and many talented former students perished during that period of the war. This was a crime committed by the state.

The formation where V.A. was enlisted was soon was encircled and destroyed by the German troops and V.A. was wounded. He tried to disappear in the villages but finally was caught by the Germans and then spent almost two years in Hitler ‘s prison camp.

He was able to conceal his ethnicity and thanks to that he survived;

he knew very well German (he spoke it without any Jewish accent) and Azerbaijani and had no evident signs of Jewishness. He was liberated as late as 1944 by the Red Army. After a short period of army service, he was again arrested, now by NKVD and spent almost two years in Stalin’s camp on suspicion of being a spy...

Most of Moscow mathematicians, including Kolmogorov and Pontryagin were sure at that time that he had perished during the war, yet Rokhlin managed to send a secret letter (a note thrown from the train that transferred the prisoners of Hitler’s camp to Stalin’s camp) to his fiancée Ariadna (later she became wife of V. Asmus). She knew A. Kolmogorov and then informed him that V.A. was in prison.

I think that Kolmogorov and Pontryagin did the most courageous act of their life a citizen can do, namely, they wrote a letter to the chief of NKVD with a request to free V.A. Rokhlin. They evaluated V.A in that letter as (literally) “the most prominent and gifted mathematician of his generation in the country”. Surprisingly, the letter reached the goal and V.A. was released in September 1946 and arrived to Moscow.

During the next one and half years he instantly defended both dissertations (candidate and doctoral), in which he obtained his remarkable result in ergodic theory: foundation of measure theory after von Neumann, classification of sub-sigma-fields,
the brilliant Rokhlin lemma and many others. He became an assistant of Moscow Steklov Mathematical Institute as secretary and colleague of L. Pontryagin. During this period and later, he studied modern topology and obtained his fundamental remarkable results in low-dimensional topology, theory of cobordisms, algebraic topology and others.

He became one of the first topologist in Russia who followed contemporary international tendencies in algebra and topology and being a pioneer in Russia in that area. He could consider at least as an informal teacher of the new generation of Russian topologists.

At that period (1940-50s) A. Kolmogorov, L. Pontryagin, I.Gelfand, A. Plesner and others wrote reviews on his thesis, papers, pedagogical activity, and gave him recommendations in the most splendid words and formulations.

But all that support, the highest evaluations, excellent opinions of well-known scientists did not help V.A. to obtain the deserved position in Moscow.

 I included those letters together with letter to NKVD into the volume <<«В.А.Рохлин. Избранные работы» 2-nd edition, 2010, MЦHМO. >> (Surprisingly, for some obscure reason those letters were not included in a recent publication of Kolmogorov's letters. We will include English translation of those document to the AMS volume we are planning to publish).

The beginning of 1950 was marked in the Soviet Union by the antisemitic campaign, initiated by Stalin. In the spirit of this campaign V. A. was fired from Steklov Institute on a ridiculous formal reason and he was forced to leave Moscow together with his family because they have no apartment and no job. Firstly, they moved to a small town of Archangelsk, then to Ivanovo, Kolomna near Moscow where V.A. was a professor of mathematics in pedagogical and technical universities. During this period V.A. worked very hard and obtained many results in various areas but couldn’t publish much. His most favourite area of mathematics at that time still was geometry and topology. His famous contributions to the theory of dynamical systems, Kolmogorov’s entropy, are well-known, too.

Only as late as in 1960 the rector of Leningrad State University, the geometer A.D. Alexandrov invited him to Leningrad and offered a position of professor of mathematics at the Mathematical Department to chair of geometry. Starting from academic year 1960/61 till 1982 V.A. was a professor at our university.

It will be no exaggeration to say that V.A. seriously improved scientific and pedagogical situation in the mathematical department of our university. He passed to faculty some traditions and innovations from Moscow and world mathematics. He immediately organized two seminars, Topological and Ergodic, introduced new courses and new research directions, introduced an obligatory course of topology, first in the country and may be in the world. He produced new ideas in mathematical education of various levels.

Quite quickly he became one of the most respected members of the new community of Leningrad mathematicians.

He held series of lectures in Moscow, Leningrad and other universities, at colloquiums, Mathematical Societies about various areas of Mathematics, aimed at a very wide audience. He became one of the most authoritative mathematicians even in the country. His influence on many younger well-known mathematicians (Novikov, Sinai, Arnold and other) was very high.

He was able to create and manage a very strong group of mathematicians of the next generation. Of course, Gromov is the first. V.A. founded a new mathematical area, real algebraic topology and geometry. He brought up an excellent community of pupils, some of them are here.

Although the Leningrad period of his life was very fruitful, nevertheless it was not easy. The relations with administration was not so good as with scientists. He never obtained a permission from the university (and KGB, which was necessary) to go abroad to the conferences or workshops, even local, despite of his world-wide reputation and great achievements. He was able to speak to his famous colleagues from the West only at the 4-th congress of Russian mathematicians at Leningrad in 1961, and ICM in 1966 in Moscow

Of course, he was not a member of the Soviet Academy of Sciences, as the official stuff did not want to recognize him; yet he himself never payed attention to such things and looked ironically at the behaviour of some colleagues who were trying to get a career. He was indifferent to prizes, glory etc. because he had his own scale of scientific values. His public position was honest, brave and independent, and in many points quite different from the official one, although he did not express it openly. At those times such a position was rather rare among scientists and academics. I can say that such a position may be more close to that of Andrei Sakharov.

These were the reasons why the administration and the authorities did not trust V.A. and did not support him in many of his projects. The faculty and the university administration prevented him from creating his scientific school by rejecting his disciples to become members of the department, etc. His reaction was natural: he objected to all kind of bureaucrats in science. As the result of this struggle he had serious cardiac disease in 70-th.

At the age 62 in 1982 he was forced by the administration to retire despite of many request from the mathematical community to let him to continue his professorship. Of course, he continued his contacts with his pupils and friends and never complained.

It is not simple to tell about V.A.’s point of view on mathematics and mathematical activity but it is a very interesting topics. We must do this at a special meeting. His point of view was that mathematical researches must be conceptual, deep and invariant (functorial). He strongly supported the unity of mathematics but distinguished his beloved geometry and topology. He insisted on geometrical content and geometrical sense of any serious mathematical result. I remember that he regretted that he had no time to write systematically about his views on the process of mathematical creative work, to summarize his experience of thinking and work on mathematics.

V.A. was very well versed in Russian and world literature and history and liked to talk about it. His opinions were deeply thought through, unexpected and always interesting. Many people payed attention to his point of view on various topics. He liked languages and his German was excellent.

I must add few words for those who never met him about his visual image: he was always distinct, smart, spectacular, kept his own form and words, extremally courteous and polite, punctual, ironic and witty, a true Professor in any sense.

He died on 3rd December 1984 when he was 65 years old. Unfortunately, he never saw more liberal period in this country and couldn’t make use of open borders and lifted restrictions.

His wife Anna Alexandrovna Gurevich, professor of mathematics at technical university, died in 1993, and just three weeks after her death their daughter Lisa, librarian, died at the age of 38. Their son Vladimir emigrated to US in 1974 and now is a famous applied mathematician, member of US Academy.

We celebrate now the centennial of one of the greatest mathematicians and personalities of XX century.

Anatoly Vershik

August 2019

PS.

1.We have two letters to our Conference from Sergey Novikov and Albert Schwartz about role of V.A. Rokhlin. We will read it on the memorial session 21/8 and will publish it in the AMS-volume which we are planning to publish.

2. In 2010 we had organized a Fund “Rokhlin stipend” for students and graduate students of our University for achievement in studying area of mathematics related to interest of Rokhlin.

The donations to this Fund were given by Misha Gromov and later Pavel Durov. Almost 60 students and graduate students had obtained stipend and almost 40 obtained grants for visiting local and abroad conferences and workshops.

You can get the short history of the fund as well as the instruction how to take a part in the donation to Fund if you want.

A.V.