Physics – Uspekhi **44** (10) 1075 – 1081 (2001)

FROM THE HISTORY OF PHYSICS PACS number: **01.60.+g**

Yuriĭ Borisovich Rumer (on the 100th anniversary of his birth)

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DOI: 10.1070/PU2001v044n10ABEH001106

Abstract. This paper offers a biography of the eminent scientist Yuriĭ Borisovich Rumer (1901 – 1985). The appendix features two accounts in which Yu B Rumer describes his work in Göttingen and his encounters with A Einstein between 1929 – 1932.

Yuriĭ (Georg) Borisovich Rumer (referred to as Yu B below) was a genuine scholar, a specimen of that rare breed that included Planck, Einstein, and Bohr. His gift, perhaps, was not as powerful as theirs but he was similar to them in his profound and disinterested fascination with the graceful beauty and grandeur of the laws of nature and the marvelous ability of the human mind to perceive these laws. He was a wonderful person and a great teacher, too.

Yu B was born on April 28, 1901. He was the youngest of the four children of a Moscow merchant Boris Efimovich Rumer and his wife Anna Yurevna Sigalova. Yu B was brought up primarily by Alisa Blecker, an old maid of independent means, who brought up the children of the Rumer family with same devotion as if they had been her own. She was of German descent and it was she who taught Yu B fluent German and the poetry of Goethe and Schiller.

At the age of ten Yu B was admitted to secondary school. The admission of Jews to schools in Russia at the time was regulated under a quota rule. There was another Jewish boy in his class, Boris Logovier, and two was double the authorized Jewish quota. Exceptions from the quota rule were made only for students who passed all exams with the top grades. Both boys had no choice but to earn only top grades and they remained good friends throughout their lives.

Both brothers and the sister contributed to the education and upbringing of Yu B. His elder brother Osip who was fluent in many modern languages and had an excellent knowledge of the classical languages supervised his lessons in English, French, and Latin. His sister Liza taught him literature while Isidor, a young man of many talents, helped him to master differentiation at the age of twelve [1].

In 1917 Yu B took graduation exams at the secondary school earlier than his class and entered the mathematical department of St. Petersburg University. On the evening of October 25, 1917, a detachment of insurgent sailors took over the university building and held students there before launching an attack on the seat of government. The leader of the sailors told students, ''You will sit quietly here while we perform a revolution; otherwise, you may get accidentally shot!'' When the students asked how long they would be detained he answered after thoughtfully considering the issue, ''Revolution is a weighty business but by morning we should be finished!''

Yu B transferred to Moscow University in April 1918. Owing to the turmoil of the revolutionary time he graduated the university as late as 1924 but in addition to the university education in these years he had acquired invaluable survival skills and an optimistic tenacity that proved to be of the greatest necessity for him throughout his life.

In those years many people experienced the most surprising and abrupt changes in their lives. Fantastic events abound in the biographies of those contemporaries of Yu B who later became prominent scientists, such as N V Timofeev-Resovkskiĭ, I E Tamm, P S Aleksandrov, and N N Semenov. Even when one is aware that it was not uncommon at the time, one cannot help being deeply impressed with the fantastic diversity of the activities in which Yu B was engaged in those years.

In 1918 – 1919 he held the position of the executive manager of the Moscow Institute of Rhythmical Education [2].

Yu B was quite successful as a manager as he succeeded in receiving permission from the authorities for the institute to take over the building of the former German Embassy in Moscow which had been vacant since the assassination of the German Ambassador von Mirbach.

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Received 6 April 2001
Uspekhi Fizicheskikh Nauk **171** (10) 1131 – 1136 (2001)
Translated by O A Glebov; edited by M S Aksent'eva

[1] Osip Borisovich Rumer (1883 – 1954) was a poet and translator. His translations of poems by Omar Khayam, Chaucer's tales, and Shakespeare's sonnets were widely acclaimed. Isidor Borisovich Rumer (1884 – ???) was a philologist and philosopher. His knowledge of mathematics was excellent. He was apparently the first Russian translator of Einstein's papers on the theory of relativity. In the twenties he was a private assistant to Lev Trotzky. In 1935 he was arrested by the Soviet secret police (NKVD). Nothing is known about his subsequent fate. Elizaveta Borisovna Rumer (1891 – 1986) was a music teacher and a bibliographer.

[2] Rhythmical gymnastics (a precursor of modern aerobics) was a system of gymnastic exercises performed under a musical accompaniment. It was developed by a Swiss teacher and became very popular all over the world. Under the conditions of semi-famine in Soviet Russia any novel concepts were enthusiastically welcomed and apparently nothing less than an institute was regarded as being appropriate for starting a new venture. Establishing an institute also involved hiring special teachers, providing food rations for them, and allocating premises for classes. All that was of crucial importance in those hard times.

Yuriĭ Borisovich Rumer
(28.04.1901 – 01.02.1985)

From 1919 – 1920 Yu B was a teacher at the school of military engineering, then he was a private in the Red Army, and then he was a student at the school of Oriental languages at the General Staff Academy.

In 1921 he was assigned as an interpreter to the Soviet diplomatic mission at the city of Rasht in Persia. One of his assignments was to accompany a transport of weapons to support the Young Turks revolutionary movement in Turkey. In the same year he was sent as a diplomatic courier to Moscow and resumed his university studies.

In those years Professor N N Luzin established his famous mathematical school at Moscow State University and Yu B was closely involved in its activities. Such world-famous mathematicians as A N Kolmogorov, P S Aleksandrov, L E Shnirelman, P S Novikov, L A Lyusternik, I G Petrovskiĭ, and M A Lavrent'ev were 'graduates' of the school affectionately nicknamed 'Luzitania'. The lessons learned at 'Luzitania' largely determined the academic style of Yu B which was distinguished by an aspiration to achieve extreme mathematical clarity and elegance of results.

When Yu B graduated from university the unemployment rate was extremely high and the only jobs he could find were those of an auxiliary school teacher and a statistician for the State Insurance Agency. At the same time he studied the special and general theories of relativity and his interests shifted from mathematics to physics. He found time for entertainment, too. He was an enthusiastic theater-goer, never missing a first night, and he had literary aspirations, too (for instance, he wrote parodies of the famous poets Mayakovskiĭ, Gumilev, and Akhmatova). He enjoyed practical jokes and pranks (for instance, Yu B and L E Shnirelman developed the concept of 'revolutionary cards' to be played by the members of the Communist Party and formally submitted an appropriate proposal to the Education Ministry).

His father was worried that in the atmosphere of heightening political tension in the country such pranks could cause the secret police to become interested in the person of Yu B. To take him out of harm's way his father resolved to arrange to send Yu B abroad. He was an expert in the linen trade and held a significant post at the Ministry for Trade and Industry. As linen export was an important source of hard currency earnings for the Soviet government he could pull strings and as a result Yu B was officially sent to take a two-year further study course at the Higher Polytechnical School at Oldenburg in Germany. Yu B was not entirely satisfied with the career opening before him. Therefore, after receiving an engineering diploma in 1929 he went to Göttingen where the 'kings and crown princes of science' gathered.

He went there to present a paper on the general theory of relativity[3]. He received commendations from Einstein and Ehrenfest, was awarded the Lorentz Scholarship, and from 1929 – 1932 he held the position of an assistant to Max Born in Göttingen where he met and made close friends with the founders of the quantum mechanics who continued to keep track of his life in the subsequent years. One of his friends of that period, E Weisskopf who was the director of CERN at the time specially came to Novosibirsk to see Yu B 35 years later.

Yu B was one of the founders of quantum chemistry together with H Weyl and his friends W Heitler and E Teller. Their joint pioneering studies of the spectrum and wave function of benzene and the subsequent papers written by Yu B alone demonstrated that the classical concepts of valence were not applicable to symmetrical molecules and their description had to include a quantum superposition of states. They developed a method for determining the correct initial basis of the valence states of the complex molecules which was later given the name of the theory of structure resonance. Yu B employed this method for calculating the spectrum of the benzene molecule and other ring molecules. It was one of the sources of modern quantum chemistry. The Rumer theorem and diagrams have been widely recognized and can be found in the appropriate textbooks.

In 1932 Yu B moved to Moscow and took the position of a professor at Moscow State University on recommendations given by Einstein, Born, Ehrenfest, and Schrödinger. He remained at the university until 1937 and from 1935 he simultaneously held the position of a senior researcher at the Physical Institute of the Academy of Sciences.

By the year 1938 Yu B was one of the leaders of Soviet theoretical physics. His university lectures were important events for the science community of Moscow. His monographs *Introduction to Wave Mechanics* (1935) and *Spinor Analysis* were widely acclaimed.

He was also closely involved in the rich cultural life of Moscow. His friends included major cultural figures of the period, such as the famous author I G Ehrenburg, prominent society hostess L Yu Brik, translator of Spanish poetry and a

[3] He returned to working on the general theory of relativity throughout his life. His last paper in the field was published in 1977.

Soviet agent in Spain during the civil war, O G Savich, and the famed translator of contemporary American literature Rita Rite.

Yu B used to recall, "I often visited Landau in Kharkov. I was greatly impressed with the man, even then he amounted to much more than all the other Soviet physicists taken together. None of them was aware of the distinction, however. We made plans to write books on mechanics, then we wrote together a small popular book entitled *What is the Theory of Relativity*?. The book was published 25 years after it had been written through no fault of the authors [4]. It should be noted that the subject area has changed little in that period and only a few readers notice that the book was written 25 years ago."

In December 1936 L D Landau was dismissed from Kharkov University. His closest collaborators made applications to resign their posts but the authorities regarded such actions as an anti-Soviet activity. This is why Landau urgently left Kharkov and went to Moscow. Initially Landau stayed with Yu B. Soon friends found a position for Landau at the Institute for Physical Problems of the Academy of Science. However, Yu B was obliged to give an account of his support for Landau at a staff meeting at the Physical Institute. He said, "If Landau is proven to be a saboteur I will undoubtedly be charged with a criminal offense but now I want to go on record saying that I vouch for him as my best friend." Soon Yu B was dismissed from Moscow State University. In the next term he found a teaching position at the Institute of Leather Industry.

Yu B recalled, "[Stalin's closest aide] Kaganovich had an institute he used to patronize. It was the Kaganovich Institute of Leather Industry on the Moskva River embankment (now it is known as the Technological Institute of Light Industries and Kaganovich's name has apparently been stripped from it). The members of the faculty were such: the late Shnirelman, probably the most brilliant mathematician of the Soviet Union was in charge of mathematics teaching. I was in charge of physics teaching for some reason. Khristianovich was in charge of mechanics teaching for some reason. We exerted a significant influence on the management of the institute and decided to hire assistants of a caliber 'not lower than that of Lifshits'. I Ya Pomeranchuk and E M Lifshits were given the positions of assistants. As they had full-time jobs now they received official permission from the police for residence in Moscow.

After they had been granted the residence rights Pomeranchuk, Lifshits and me came up to Landau and told him, "let us start running seminars!" Such was the origin of the famous seminar which is now held on Thursdays at the Institute of Physical Problems and known as the Landau theoretical seminar."

Yu B and Landau had time to work together only on two research projects. They wrote a paper on the theory of cosmic ray showers in which they put forward a mathematical representation of a shower as a sequence of bremsshtrahlung events and the generation of electron-positron pairs. They derived and solved the equations describing shower development and thus removed the constraints on the applicability of the initial theories of Bhabha – Heitler and Carson – Oppenheimer. These papers stimulated many subsequent studies on the wide atmospheric showers and on the physical processes occurring in the high-energy particle detectors.

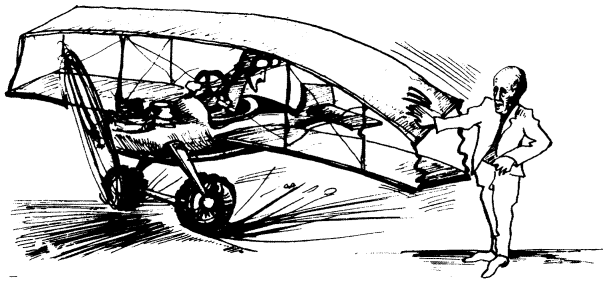
[4] After Yu B had been arrested, served his prison sentence, spent his exile period and been officially rehabilitated.

The Landau – Rumer equation describing the absorption of high-frequency sound waves in insulators is well-known in solid state theory. Landau and Rumer were the first to analyze the process of decay and combination of the waves which made important contributions to the physical processes involved in the wave phenomena. The paper laid down the foundation for phonon kinetics. It served as a model for later development of the theory of the Cherenkov emission of a phonon by an electron and more complicated processes.

Yu B was arrested on April 28, 1938 on Arbat Street in Moscow where he was going to celebrate his birthday with friends. L D Landau and M A Korets were arrested at the same time. It may be inferred from some published documentary evidence that these arrests were the first preparatory steps for another massive purge planned by the secret police. Many physicists had probably been saved from arrest owing to the courageous and wise actions of P L Kapitza who managed to achieve Landau's release from prison a year later.

The initial crime with which Yu B was charged was formulated as 'aiding and abetting the enemy of the people, Landau'. But on May 29, 1940 Yu B was sentenced by the Military Collegium of the Supreme Court to ten years in labor camp for espionage under the notorious Article 58 of the Criminal Code. He was considered 'lucky' because he was subjected to brutal interrogations without sleep for nights on end but he was not properly tortured. He was not sent to the labor camp but to a special prison for engineers where the best minds of the Russian aircraft industry and scientists were gathered to work on government-sponsored aviation-technology projects. Yu B endured the same prison hardships and worked on similar fascinating research and engineering tasks as such famous and gifted scientists and engineers as the aircraft designers A N Tupolev, V M Myasishchev, V M Petlyakov, R L Bartini, and I G Neman, future top designers of the Soviet aerospace technology S P Korolev and V P Glushko, the celebrated Arctic aviator V M Makhotkin, and full members of the USSR Academy of Science A I Nekrasov, B S Stechkin, Yu A Krutkov, and P A Valter.

In prison Yu B specialized in the analysis of the vibrations of aircraft structures. He used to claim to his students that if he put his hand on the aircraft wing he could predict its vibration strength and probably it was not a mere boast.



Cartoon by Yu V Parfenov

Yu B worked together with B S Stechkin on developing a damper for the bending vibrations and on describing the forced oscillations in the extensive systems of crankshafts that proved to be major problems for A D Charomskiĭ who was in charge of designing a diesel engine for aircraft in 1939 at the Tushino Engine Design Bureau near Moscow. Yu B applied methods of analytical mechanics and noted that the resulting system of equations can be greatly simplified if the symmetry

of the problem is taken into account. B S Stechkin was literally charmed with this approach which was entirely novel for him as he was a disciple of the famous aviation engineer N E Zhukovskiĭ and had been taught to write down cumbersome systems of equations for the forces and their moments for resolving such problems. Obviously, if such methods and results had been published they would have been highly useful for the Soviet engineers but all technical reports submitted by the researchers were hidden for ever in the secret archives of the 4th Special Department of the NKVD (the Soviet secret police).

In the secret research institution TsKB-29 (Central Design Bureau-29) in Moscow the prisoner Yu B was given an assignment to describe the self-oscillations of a rolling rigid wheel (known as shimmy vibration). An experimental apparatus was constructed for verifying the theoretical predictions. A small wheel fixed on a rod simulating the aircraft undercarriage rolled over the cylindrical surface of a rotating large-diameter drum. The vibrations of the wheel were registered with a recording instrument. The paper "Shimmy of the Front-Wheel in a Tricycle Undercarriage" (*Trudy TsAGI*, No. 3, 564, 1945) written by M V Keldysh the foremost Soviet expert in the field includes a reference to the results obtained by Yu B which was a rare example of academic integrity under political conditions when it was dangerous merely to mention the name of an 'enemy of the people'.

Yu B worked in close collaboration with the head of the theoretical division of TsKB-29, Academician A I Nekrasov. Together they wrote the monograph *Theory of a Wing in a Non-Stationary Flow* which was published in 1947 by A I Nekrasov, who had only recently been released from prison, as the sole author (Yu B was still in prison and his name could not be included). In 1948 Nekrasov gave Yu B a part of the royalties he had received for the book. But when the book went into second printing after Nekrasov's death (1962) Yu B was not mentioned as its co-author.

In prison Yu B made good friends with Karl Szilard, a man of rare kindness and high moral integrity. He was a Hungarian expert on aerodynamics who had arrived in the USSR to help build socialism. After his arrest his main worry was about his family. He was terrified that his wife, a foreigner, who could barely speak Russian and had two small children to care for, could easily perish without him. Yu B did his best to support his 'dear friend Karl' and specially learned Hungarian for that (he knew thirteen languages altogether) [5].

As the new aircraft designed by TsKB-29 one by one became airborne (the bombers Pe-2, Tu-2 and DB-102 which was designed by Myasishchev but not put on the production line) many imprisoned engineers were freed before the end of their sentences. Those who were not freed were sent to the Taganrog research prison where R L Bartini was designing a new cargo aircraft. Before and during the war the imprisoned engineers worked very hard as they believed they were contributing to the defense effort and hoped for an early release from prison. In Taganrog prisoners just waited for the end of the prison term. They were poorly fed and the harsh prison rules were enforced exceedingly brutally.

From the first days in prison Yu B made attempts to work on fundamental research projects. He asked for a subscription to the academic journals *Phys. Rev.* and *Zh. Eksp. Teor. Fiz.* His colleagues Yu A Krutkov and P A Valter could not support his efforts. It was impossible for Yu B to follow the current developments in physics by himself because he was very busy with the everyday engineering calculations. He always had in mind, however, one great task on which he could work without regularly reading new academic papers and discussing new results. It was the magnificent task of developing a unified field theory. The scale of the task and the repeated failures of Einstein to tackle it guaranteed that any new developments would become generally known fairly soon while it seemed quite improbable that several researchers would put forward identical and really novel concepts.

He had been made to waste ten years of his life and he intended to prove to himself and to the world that he still ***was*** capable of achievement. He was not the only prisoner scientist cherishing such hopes. An outstanding astrophysicist developed a superficially attractive theory of the origin of the world which still serves as the creed for a large community of ignorant believers in pseudoscience. An outstanding aircraft designer developed the ***Theory of Everything*** which baffled scientists and created a minor media scandal.

In his last years in prison Yu B developed the early ideas he had put forward in his first publications and managed to write a series of papers on what he referred to as 5-optics. He included the electromagnetic field into the model of the general relativity theory and increased the dimensionality of the space-time to five. Similar ideas had been put forward earlier by T Kaluza, O Klein, and V A Fock. What was novel was the idea of compactification of the fifth dimension, identifying it as action, and identifying the period as the Planck constant. Then the charge is automatically quantized while the gauge invariance acquires the meaning of the general transformation of the fifth coordinate.

Шива

Cartoon by Yu.V. Parfenov

In one of his papers in that series Yu B suggested introducing spinors into the general relativity model involving freely rotating reference marks at each point of the curved space-time. This concept is interpreted in terms of fiber spaces in the contemporary theory. Yu B was fascinated with the new vistas in physics opening before him and he daily dedicated several hours of contemplation to this theory which made it easier for him to endure the vicious blows of fate typical of the prison life. Yu B failed to suggest new physical effects that could help to verify experimentally his theoretical concepts. This is why many prominent physicists believed that his theory was merely a fascinating conjecture, a fantasy that bore no relation to the

[5] Karl's wife and children did not perish. In the late fifties he and his family returned to Hungary where he was welcomed by the authorities and made the President of the Hungarian Academy of Science. Karl could correspond with Yu B only through private channels because all his letters disappeared in the post. He sent official invitations to Yu B on behalf of the Academy to come for academic events in Hungary but the Soviet authorities refused to let Yu B go. Just before his death Karl received news that Yu B once again was not allowed to travel outside the USSR and he burst into tears realizing that he would never see his prison friend.

real world. Yu B just managed to publish about ten papers after being released from prison and that was that.

These days the compactification of the 'extra' dimensions is a commonplace operation in the theory of strings. In recent years the papers on 5-optics written by Yu B have been increasingly referred to.

While incarcerated in the Taganrog prison Yu B formulated his main concepts of 5-optics and wrote a paper on the magnetism of electron gas. He put forward an elegant and efficient technique for calculating the partition functions for the quantum perfect Bose and Fermi gases in an external magnetic field. The technique was employed to analyze the behavior of the magnetic susceptibility of the electron gas in arbitrary magnetic fields at any temperatures. Yu B noted that model systems did exist which could not be heated to a temperature exceeding a certain limit. A follow-up to this paper was his subsequent paper on Bose condensation in which he demonstrated that the character of the transition changed essentially when an external field was applied. The cumbersome numerical calculations for the paper were meticulously done with a calculating machine by Olga Mikhailova, a recent graduate of the aircraft engineering college, who was his assistant in the vibration analysis team. Later Olga became his wife and the mother of his children.

Typically prisoners were released on the exact days their prison terms were completed. Some time before the release they were transferred to an ordinary prison from the secret research prison and the day after their release they appeared at the design bureau as ordinary employees. That was what happened to Karl who had been released a month earlier. But Yu B never appeared at the office. He was subject to a newly promulgated regulation under which the released political prisoners were stripped of their civil rights for five years. This meant being exiled to a distant area of Russia and carried there by a prisoner transport under strict security rules.

The friends of Yu B had no news of him and had the worst suspicions and premonitions about his fate. They learned what had happened to him only in mid-May 1948 when his brother Osip received a telegram from the small town of Eniseĭsk in far-away Siberia.

Olga went to join Yu B in Eniseĭsk via Moscow where she brought handwritten papers by Yu B and gave them to L D Landau, M A Leontovich and some other physicists. Under the political regime of the time the most effective assistance that physicists could render to their exiled colleague was to publish his papers. As early as June and July of 1948 they edited and prepared for publication three of his papers. E M Lifshits who was the deputy editor of the *Journal of Theoretical and Experimental Physics* (*JETP*) did all he could to publish them as soon as possible. Later he always facilitated the processing of all subsequent papers submitted by Yu B. The publication was the first signal to the outside world in ten years that Yu B was still alive and working. Friends in Moscow collected donations to help Yu B survive the Eniseĭsk exile and sent him the newest books and papers that could help him to catch up with the latest developments in science.

The years of the Eniseĭsk exile between 1948 and 1950 were filled with joys, worries, and hopes for Yu B. He was lucky to be appointed to the position of instructor at the Eniseĭsk Teacher's Institute and to be allocated a furnished room at an address that read the Street of Workers and Peasants. That was an unbelievable piece of luck as the influx of exiled prisoners to Eniseĭsk made the prevailing housing shortage even more acute. His wife Olga came on July 21. They managed to make a store of firewood for the coming frosty winter. During his Eniseĭsk exile Yu B found the exact solution for the Navier–Stokes problem of a submerged jet with a finite momentum flux. This solution proved to become one of the reference points in hydrodynamics.

During the same period Yu B was analyzing the famous paper by Onsager on Ising's model. The paper had been published in 1944 but was received in the USSR only two years later. The mathematical technique employed in it was so complicated that nobody could understand it until Yu B started studying it. He not only made clear the special algebra developed by Onsager but also reduced it to the algebra of spinors in a multidimensional Euclidean space. The reduction resulted in a significant simplification of Onsager's treatment. Bruria Kaufman (USA) put forward the same concept at the same time (in 1949). Unfortunately, Yu B concentrated on his work in 5-optics at the time and he published his valuable result only in a review article in 1954 and all the honor went to Kaufman.

His colleagues did not stop their efforts to lighten the burden of exile for Yu B and in late 1950 they arranged for his transfer to Novosibirsk. Unfortunately, the old Russian rule of the best intentions producing the worst results operated as it inevitably does in our life. The President of the USSR Academy of Science, S I Vavilov, exerted his personal influence to transfer Yu B to exile in Novosibirsk. Unfortunately, Vavilov died in January 1951 and there was nobody else who could help the exiled scientist to get any job in a large industrial city with several universities and numerous research institutions. For two and a half years Yu B could not get any paid work with the exception of occasional and poorly paid translation jobs. Assistance from friends was the only means of subsistence for him, his wife, and a small son. The feeling of humiliation was intensified by twice weekly reports to his police supervisor who threatened him with banishment to a much worse location if he failed to get a proper job.

One stormy night Yu B had a visit from G L Pospelov, a geologist who had a position with the West Siberian branch of the Academy of Sciences. Pospelov drafted a letter to Stalin on behalf of Yu B and suggested sending it without changing a single word. Yu B recalled later that the letter had been so clearly, lucidly, and consistently written, starting from the address line and ending with the signature line that he just could not suggest even the minutest amendment in the text. Since then Yu B always praised Pospelov as the foremost author of modern times. It was by no means a facetious appellation, Yu B always intensely admired a perfectly done job, be it writing a letter to the awesome ruler, a paper on theoretical physics, or a well-mended water tap.

The letter produced an effect. In December 1952 Yu B was invited to Moscow to participate in a discussion of 5-optics.

Yu B ardently hoped for a recognition of his success in 5-optics development. Between January 1949 and 1953 *JETP* published nine of his papers of 5-optics. The tenth paper was published in 1959 while in 1956 a monograph presenting a survey of his results was published. The Moscow discussion revealed that the community of physicists did not agree that his papers on 5-optics were first-class achievements of the world level. As a result Yu B abandoned his aspiration to return to the front ranks of the active world-class physicists that had helped him to survive the previous fifteen years. Apparently, that was the reason for his refusal to return to

Moscow after his legal rehabilitation when he was made free to reside anywhere in the USSR.

Yu B returned from Moscow to Novosibirsk to continue the life of the unemployed exile stripped of civil rights and obliged to report regularly to the local police. The official statement made after the conclusion of the Moscow discussion said that Yu B 'was recommended to continue his research work'. His influential friends helped him to make a good use of even that bureaucratic phrase. The Soviet government decided to develop the research facilities in Novosibirsk. Stalin had just died and the stigma of a political exile was no longer an important obstacle preventing Yu B from getting a research job. The Siberian officials were advised to look at the promising figure of the local physicist when they needed a suitable candidate for supervising the Novosibirsk physics.

In 1953 Yu B was appointed to the position of a senior researcher at the West Siberian Branch of the USSR Academy of Science. In October 1953 the degree of Doctor of Science and the rank of Professor were restored to him (as a political prisoner he had been stripped of them). After his legal rehabilitation in July 1954 Yu B was allowed to start teaching at the Novosibirsk Teachers' Institute. Yu B was an impassioned supporter of Khrushchev and continued to be one despite the well-known blunders of the latter's rule because he was grateful for 'the marvelous idea to free the innocent prisoners'.

Between 1956 and 1964 Yu B held the position of the Director of the Institute of Radiophysics and Electronics which was the first physics research institution in Novosibirsk. While he held that position Yu B focussed on supporting gifted researchers giving them all possible freedom of action and was always wary of hiring dull people. Among the first young and gifted researchers he hired were P A Borodovskiĭ and Yu V Troitskiĭ who did important work in experimental radiophysics. The former head of the division of technical physics G V Krivoshchekov established the Laboratory of Nonlinear Optics after the discovery of lasers. The brilliant young laser researcher V P Chebotaev came to work at the Institute as a university undergraduate, Yu B trusted his talent, supported his research efforts from the very beginning and gave him complete freedom of action. Soon he advanced the laser experimentation in the institute to a much higher level.

Yu B took especial care of the theoretical group he had set up at the institute. Later its members joined the theoretical division of the Institute of Semiconductors of the Siberian Branch of the USSR Academy of Science. Yu B believed that the establishment of this group was one of his major academic achievements. Indeed, one of the greatest talents of Yu B was that he always built a very special creative atmosphere around himself wherever he was doing research. It was not accidental that many physicists who started their careers around him or in collaboration with him later grew to become prominent researchers known for the their exceptional research results. In Moscow his circle included V L Ginzburg, E L Feĭnberg, M A Markov, and L V Al'tshuler and in Novosibirsk the physicists who were friendly with him included V L Pokrovskiĭ, A Z Patashinskiĭ, A M Dykhne, A P Kazantsev, G I Surdutovich, A V Chaplik, M V Entin, B G Konopel'chenko, L I Magarill, and E M Baskin.

The theorists were working on the applied problems of radiophysics, such as the theory of antennas and wave-guides, as well as on the fundamental problems of quantum mechanics, statistical physics, solid state physics, plasma, and atomic physics. When Landau was speaking in support of Yu B as a candidate for membership of the Academy of Science at a general session of the Academy he noted that the successful work of the new theoretical group was a weighty argument in favor of electing Yu B to the Academy. Unfortunately, despite the support of many prominent physicists and the head of the Soviet space effort S P Korolev, Yu B was never elected to the Academy.

While many gifted researchers came to Novosibirsk after the establishment of the Siberian Branch of the USSR Academy of Science a bitter infighting developed between the various levels of the administrative hierarchy of the Academy. Yu B did not understand much about the office politics and was too trusting. Naturally, the time he held the job of the director of an institute was inevitably short. The last drop that made the cup run over was the case of a prominent radar expert V S employed at the Institute. V S had a very good relationship with the military and the military allocated huge sums for a project involving construction of immense antenna fields. The military promised more money for the project than the total annual budget of the entire Siberian Branch of the USSR Academy of Science. The Head of the Branch, M A Lavrent'ev, was deeply hurt by the violation of administrative priorities and closed down the Institute of Radiophysics merging it with the Institute of Solid State Physics and setting up a new Institute of Semiconductor Physics. Yu B lost his position, moved to the Institute of Mathematics for a short time, and finally settled down as a researcher at the Institute of Nuclear Physics of the Siberian Branch of the USSR Academy of Science.

His primary concern was always research work and teaching. His friends recall how delighted he was with Feynman's opinion that a positron was an electron moving backwards in time, how proud he was with the important results on the second-order phase transitions obtained by V L Pokrovskiĭ and A Z Patashinskiĭ, and with the results of other researchers who belonged to his circle.

Yu B was always deeply interested in mathematical features of any theory and he especially admired clever uses of symmetry properties. When Yu B heard about the discovery of the genetic code he deduced that the symmetry properties were to be essential for its description. He wrote a paper on the classification of codons in the genetic code using the symmetry principles and some linguistic arguments. F Crick gave a complimentary reference to this paper. The paper was widely reviewed in different countries and revived for Yu B the feeling of being able to produce high-class results. When biologists and biophysicists sent letters asking Yu B for reprints of his paper he wrote answers in longhand starting with the words, "Thank you for your interest in my first paper on biology!" The pioneering contributions of Yu B were important steps in the development of the modern description of the genetic code.

In the sixties the group classification of the elementary particles was extremely fashionable in the community of physicists and Yu B explored opportunities for using symmetry principles for describing the physical phenomena. For ten years he worked in collaboration with the mathematician A I Fet. In addition to a number of papers they published the monographs *Theory of the Unitary Symmetry* (1970) and *Group Theory and Quantized Fields* (1977). Yu B also worked on similar problems with his disciple B G Konopel'chenko.

Yu B taught the students of Novosibirsk State University for almost twenty years. Using his lecture course together with M S Ryvkin he published textbooks for undergraduates *Lectures on Thermodynamics, Statistical Physics, and Kinetics* (1972, 1977, 2000). The authors presented the laws of thermodynamics in an unconventional way which allowed the students to make fast progress in their studies and start solving serious problems early in the course. Many generations of students of physics received a very solid 'basic thermodynamic training' in this way. Yu B enjoyed having discussions with young people; many people who were students and young researchers in Novosibirsk, not necessarily physicists, still remember his fascinating stories and arguments.

He never lost his interest in the humanities. The famous author S P Zalygin and the renowned translator R Rite-Kovaleva were his friends.

When his health failed in 1978 he had to discontinue his university teaching work. Books on gerontology and Parkinson's disease found their way to his work desk in addition to the books on physics and linguistics (Yu B was interested in the Tungusic languages at the time). His eyesight deteriorated rapidly and by the end of his life he could not read.

Yu B Rumer died on February 1, 1985.