

*A Gift to Vitalyi Ginzburg on the occasion of his 90 year birthday,
4 October 2006.*

Boris Altshuler

**Three Friends:
Lev V. Altshuler, Vitalyi L. Ginzburg and Veniamin A. Tsukerman**

*“It was in 1932, Venya and Lev where then 19 year old, I was 16. Venya proudly called us ‘VVV’ – ‘Vsegda Vpered Vsekh’ (Always Ahead of All), or Venya, Vitya and Vladimirovich Leva”,
Vitalyi Ginzburg¹*

My father Lev Altshuler (1913-2003) and Veniamin Tsukerman (1913-1993) first met in September 1928 when they began to study in the 2-year constructor-building college. **Tsukerman recalls:** “I paid attention to Leva from the first days. Once in a break I saw him quite emotionally arguing with another pupil. In few seconds an ink-pot flew through the class-room and smashed to smithereens over the wall leaving there a big ink-stain. I liked the quickness of reaction. This one is always capable to stand up for himself. After this ink-pot event our friendship began”.² This friendship proved to be life-long.

Now Lev Alshuler speaks:

“The gift of fate was my schoolmate Veniamin Tsukerman. Ever since his childhood he has been gradually losing his eyesight and eventually turned completely blind. The creator of the Russia's nuclear shield Yu.B. Khariton once wrote about him the following: "Veniamin Aronovich, despite a grave illness has done so much... that his life was a real heroic deed". Being absolutely blind in Arzamas-16 he headed a large experimental department and among many awards he valued most of all the Title of the Merited Inventor of the RSFSR. Being a high authority, he helped a lot of people, he organized in Arzamas-16 a club of physics and mathematics for gifted children and was prime mover of a special TV programs for the deaf. In my life and in the life of my family he was the most important person. In fact, all the key landmarks of my way are connected with him... In 1932 he took me to his X-ray Lab, in 1942 during the evacuation period in Kazan' he bestowed my sister and her sick child in his overcrowded room, in 1947 already in Arzamas-16 he shared with me two highly skilled researchers Samuil Kormer and Konstantin Krupnikov, and in 1951 with a risk for himself he saved me from the seemingly inevitable repressions”.³ - Those are only few out of many of my father's grateful reminiscences about Tsukerman.

In 1930 Professor Evgenyi Bakhmet'ev (he later perished in Stalin's purges) invited a young radio fan Veniamin Tsukerman to his newly organized educational Roentgen Lab in the Evening Machine-Building Institute in Moscow. In 1931 Vitalyi Ginzburg joint the Lab. As he explains in his “Nobel Autobiography” there was no possibility at that time to continue regular school education after the 7th form, and he writes: “...not at all willing to enter a FZU (vocational schools, which were supposed to train skilled factory workers), I did not follow this way. So for a while I, then a boy of 15, remained rather lost and unhappy” [4]. Thus the work in Tsukerman's Lab was a

¹ Vitalyi L. Ginzburg, “To the Memory of Veniamin Aronovich Tsukerman”, in the book [1].

² Veniamin A. Tsukerman, from the Chapter “Friends of 30-th” in the book [2].

³ Lev V. Altshuler, “Fate was kind to me”, in the book [3].

real fortune for him. In 1932 Tsukerman invited to the Lab Lev Altshuler who had just come back to Moscow from the rural Volga region after 2 years of building pigsties. Once I asked my father why he did not continue this promising carrier. He said that he was no good at it: “The poles which I put up proved to be crooked”, - he clarified.

Three friends were the core of the X-ray Lab. **Vitalyi Ginzburg**: “*The key figure in the laboratory was Veniamin (Venya) Tsukerman, quite a young man (only three years older than me) with truly uncommon inventiveness and initiative*” [4]; “*Already at this time Venya used to invent. I remember we constructed X-ray tube with rotating anticathode which permitted to use stronger current without melting of anticathode, hence the intensity of X-ray radiation was essentially increased. This was in 1932...*” ([1], p. 16). Tsukerman writes that he even tried to patent the invention but was refused since the same was proposed in 1896 by Thomas Edison. “*I did not feel aggrieved, - he remembers, - since this was a competition with great Edison himself*” ([2], p. 14). Soon Vitalyi Ginzburg and Lev Altshuler entered Physics Department of the Moscow University which was not a simple task since both were not of “workers” origin. Vitalyi Ginzburg recalls ([1], p. 17) a funny episode of 1933 when Veniamin Tsukerman tried (unsuccessfully) to solicit for “*his young talented laboratory assistant*” with Rector of the Moscow University and since he wanted to look more important, he was only 20 years old after all, he borrowed from friends a hat, a suit and put on spectacles with simple glasses; while Tsukerman was at the reception in the University Ginzburg waited for him in Alexandrovskiy Garden near the Kremlin Wall. Vitalyi Ginzburg writes that he decided to tell about this not so significant episode since it “*characterizes Venya, his aspiration to help to other people, not to be concentrated only on himself*” ([1], p. 17). The cooperation of three friends continued for years and friendship – for decades. I was born in 1939 and Vitalyi Ginzburg says that has known me since my baby years.

In 1940 Tsukerman’s Lab was moved to the Institute of Engineering of the USSR Academy of Sciences; their first task was “*to improve the technology of filming with the X-ray flashes of the bullets and other quickly moving objects*” (Veniamin Tsukerman in the book [2], p. 16). And also since 1940 Vitalyi Ginzburg has been working at the Levedev Physical Institute. During the war time Academy of Sciences was evacuated to the Town of Kazan’ at the Volga River, and three friends again found themselves in the same geography spot (Vitalyi Ginzburg and Veniamin Tsukerman were not drawn to the Army because of health problems whereas Lev Altshuler was called back from the front in 1942 among the “one thousand” important scientists). Yakov Zel’dovich, Igor Kurchatov, Petr Kapitsa and many other scientists also lived and worked in Kazan’ at that time. Tsukerman recalls ([2], p. 35) how the insight of the X-ray filming of the explosion of the trophy German *Faustpatrone* came up to him (“*Suddenly bright as lightning all overlapping guess: we must make the X-ray filming of explosion of this shells*” [2], p. 35). Yuli Khariton was the first who he approached to discuss the idea (this was on 25 August 1942). Soon Lev Altshuler came from the Army and joined the work; finally they managed to diagnose the mystically strong effects of German shaped-charge jets striking tank armor. In May 1943 Yakov Zel’dovich brought some of their X-ray photographs to Moscow to Yuli Khariton. And in the August of 1943 Tsukerman reported these results in the Ministry of Weapons. In their scientific work Altshuler and Tsukerman were quite active, sometimes offensive (cf. the story with the ink-pot above), they showed enormous energy, managed to overcome any difficulties and any resistance, and did not hesitate to criticize strongly everybody who was mistaken according to their views. In Lev Altshuler’s

personal archive there is a book by Yakov Zel'dovich "Theory of Burning and Explosion" published in 1944 with such an inscription: "To brothers-brigands Altshuler and Tsukerman from the author who has not become their victim so far".

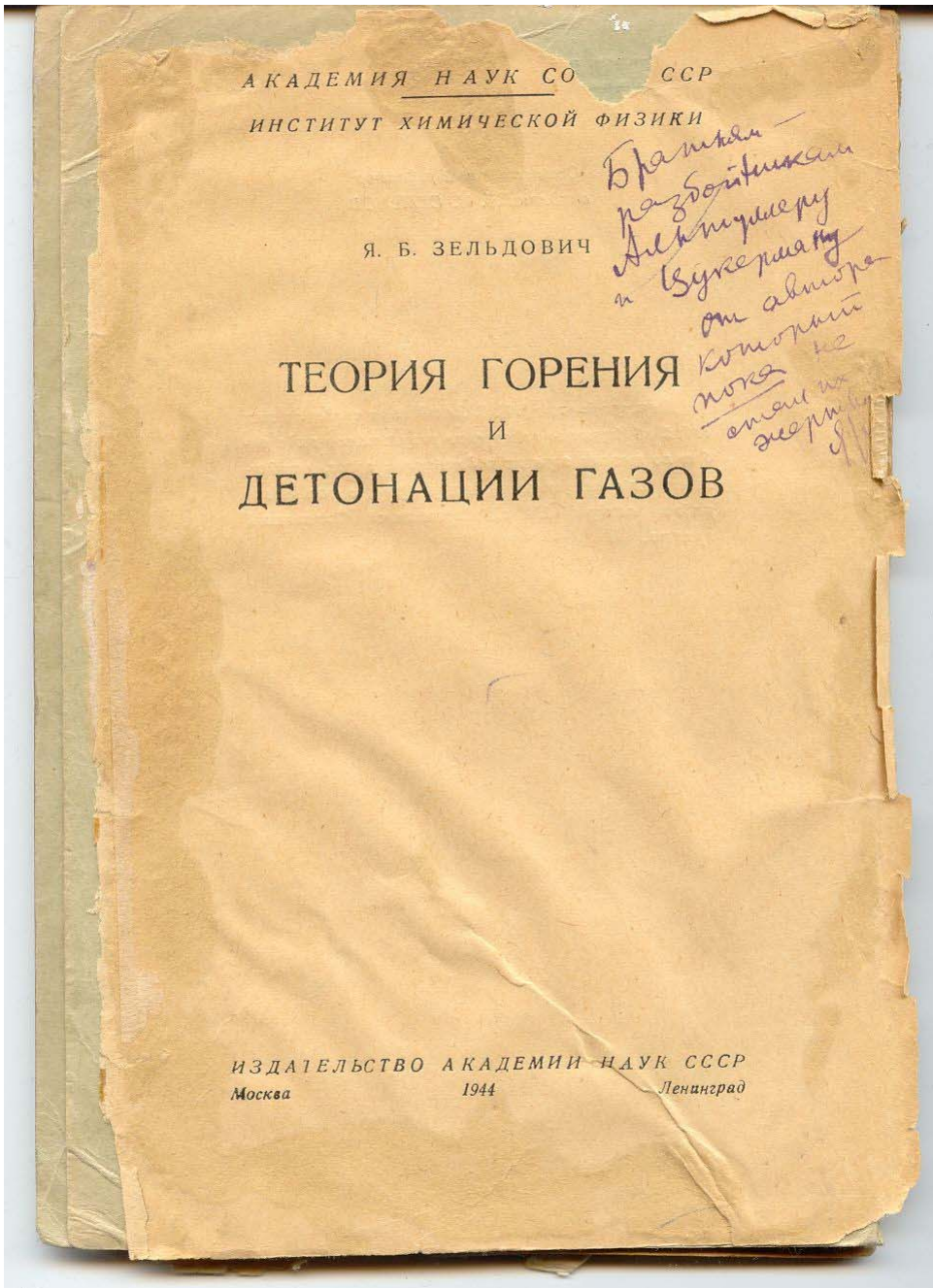


Fig. 1: Fascimile by Yakov Zel'dovich on the book presented to Lev Altshuler and Veniamin Tsukerman, 1944: "To brothers-brigands Altshuler and Tsukerman from the author who has not become their victim so far".

"The life in Kazan' was quite difficult, especially during the first year of evacuation, - remembers Tsukerman's wife Zinaida Azarkh (1917-2004) – our food was mainly pea, sometimes potatoes... In the Institute canteen the pea porridge was given in the faceted glasses, whereas diameter of spoons in the canteen was bigger than the glasses. The scientists seriously tried to resolve the

problem how to get out the porridge from the glass. In these discussions Veniamin Tsukerman first got acquainted with Igor Kurchatov. In the Summer of 1942 Governmental Commission visited institutes of the Academy in Kazan' – to check up how scientists are supplied with food. All scientists were humbly silent about the situation, only Academician Petr Kapitsa came forward and showed to the Commission the loose belt of his trousers adding that "Earlier there was a belly. Where is it now?" This Kapitsa's demarche strongly impressed the Commission, the nutrition of scientists was improved. And after Venya became PhD he began to receive an increased food ratio which made the life of our big family easier." ([1], pp. 24-25).

Food was not the only problem. There was lack of everything, even electricity was switched off in winter time for weeks. However Tsukerman and his colleagues managed to continue the impulse X-ray radiography experiments in absence of the electricity supply. *"I found in students lab the circular Whitehead electrostatic machine and arranged to take it to our Lab temporarily. Rotation of its handle permitted to charge the old-fashioned glass condenser to 100 kV and more... the problem of filming of quick processes was resolved."* (Veniamin Tsukerman, Chapter "Work and Life without Electric Power", in the book [2]). My mother Mariya Speranskaya (1916-1977) as well as Tsukerman's wife also worked then in his Lab in Kazan'.

* * *

And it is necessary to say about Lidiya Kurnosova (1918-2006), astrophysicist and a good friend of our three heroes during many years. *"They appeared in Kazan' in the August of 1941. Her husband was Oleg Vavilov, son of the famous genetic biologist Nikolai Ivanovich Vavilov. Oleg worked in the cosmic rays laboratory of the Lebedev Institute. We closely contacted when worked together on elaboration of the X-ray and gamma-thickness gauge... In 1943 we knew that Oleg's father Nikolai Vavilov, arrested in 1940, is held in the Saratov jail. Oleg did his best to meet his father but after long red-tape NKVD informed him that Nikolai Vavilov died from dystrophia... Such was the death from starvation of the world renowned scientists who dedicated his life to struggle with famine"* (Zinaida Azarkh, from the Chapter "Legendary Lidochka", in the book [1]).

Oleg Vavilov defended his PhD thesis in the Lebedev Institute in the January of 1946, soon he went to the expedition to the Caucasus mountains and vanished there. After the return of the group to Moscow they explained that one of the members of the expedition suggested Oleg Vavilov having a ski walk over ice-flow. This man came back in the evening and said that Oleg perished falling down the ice-crack. No real efforts were undertaken to find him. *"Lidiya immediately went to Donbay to organize the search of Oleg. However this expedition was not successful – there was too much of snow in the mountains. New expedition was organized in the Summer. This time Lida herself found Oleg. He was found about 30 meters from the place of falling. Hence it was evident that he had been alive after the falling!"* (Zinaida Azarkh, [1] p. 79). This was a most strange event, and there are convincing arguments that Oleg Vavilov's activity in the attempts to find truth about his father's death resulted in Josef Stalin's and Lavrentyi Beriya's decision to get rid of him without any fuss. The truth is that Stalin and Beriya were really fed up with the avalanche of protests of foreign scientists in defense of Nikolai Vavilov and they evidently did not want a new wave of it.

* * *

It is well known that in 1946 Yuli Khariton proposed to Veniamin Tsukerman and Lev Altshuler to join the Soviet Atomic Project; in 1947 they and their families moved to the Town of Sarov, where

Nuclear Center later called Arzamas-16 was organized. Independently in 1948 Vitalyi Ginzburg was invited (as well as Andrei Sakharov and some other theoreticians) to join the Igor Tamm Group in the Lebedev Institute targeted at development of the H-bomb. Later Tamm and Sakharov also moved to Arzamas-16. Vitalyi Ginzburg was not permitted to follow them since he was a “politically suspect” – *“in 1946 I married the repressed in 1944 Nina Ivanovna Ermakova (from 1947 her surname is Ginzburg), who was practically in exile in Gorkyi. Her father, engineer and the old member of the Communist Party, was arrested in 1938 and died in Saratov jail in 1942 (it was the same place where Nikolai Vavilov died approximately at the same time). Nina was student of the Mech-Math. Dep. of the Moscow University, she was arrested together with a group of young people on accusation of preparation of assassination of Stalin, etc... According to KGB scenario Stalin was to be shot dead from the window of apartment at the Arbat street where Nina lived...”* ([5], p. 209). Vitalyi Ginzburg describes the story in detail. I’ll repeat it in short here since it shows that we – physicists, who do not believe in the extra-natural forces, really must worship the salutary theory of probability (which sometimes must be called “theory of improbability”). The death penalty to Nina and her mates seemed to be inevitable, but at the very end of the so called “investigation” investigators found out that the notorious window faced the yard, not the street. This formally demolished all their legend, violated special axiomatic of behavior of terrible machine of repressions. As a result the accusation was quickly changed to the standard “counter-revolutionary anti-Soviet activity” and Nina Ermakova were sentenced to ridiculously small (according to standards of these years) term of imprisonment – 3 years. She was released in 9 months because of the post-war amnesty. But she was not permitted to live in big towns and settled in the village Bor against (over the great Volga River) the Town of Gorkyi. Vitalyi Ginzburg was then a visiting professor in Gorkyi, they met and got married there. *“Until 1949 she illegally lived in the room which they gave me in Gorkyi, but in the end of 1949 on solicitation of Alexander Andronov authorities gave her residence registration in the town (this happened after the tragedy on the Volga on 29 October 1949 when the boat which took people from Gorkyi to the village of Bor turned over and from approximately 250 passengers there were only 13 survivors, Nina among them)”* (V. Ginzburg, [5], p. 209). That is how Theory of Improbability works. We may suppose that authorities showed certain liberalism giving to Nina Ginzburg residence permit in Gorkyi after this terrible accident because Vitalyi Ginzburg had already become the member of the H-bomb team in the Lebedev Institute. *“Only in 1953, after Stalin’s death, when there was new amnesty Nina could move to Moscow”* [5]. **Now Vitalyi Lazarevich and Nina Ivanovna have been together for 60 years which must be admired and greeted!!!**

* * *

The Bomb proved to be salutary in many aspects: it saved the Soviet physics from being destroyed like it was done with biology and genetics, it saved Vitalyi Ginzburg who had been attacked in 1947 in federal media as “idealist” and “cosmopolite”, it saved Lev Altshuler who with his openness and immediate reactions had said in 1951 to an important commission visiting Arzamas-16 that he disagreed with the Communist Party line in biology. Immediately the Order was given to banish Alrshuler from the Arzamas-16, the subsequent arrest was quite probable. But deep at night Veniamin Tsukerman came to the cottage of Deputy Minister Avraam Zavenyagin and spoke in defense of Altshuler explaining that there will be no bombs without him. In the morning the same was repeated by Andrei Sakharov and Evgenyi Zababakhin. Altshuler’s banishment was postponed, but even a year after a special call by Yuli Khariton to Lavrentyi Beriya was necessary to save my father.

* * *

Thus Vitalyi Ginzburg was not admitted to move to the Nuclear Center. But it so happened that in the end of June 1955 the H-bomb brought the three friends together in Arzamas-16. The key words of this event are “radiation implosion” (“Third Idea” as Sakharov put it). The well known “First Idea” (Sakharov, 1948) and “Second Idea” (Ginzburg, 1948) permitted to create the first Soviet H-bomb tested on 12 August 1953. Then followed great unsuccessful efforts to increase its power and at some moment in 1954 the idea of the radiation implosion came to Sakharov, Zel’dovich and their colleagues. Sakharov writes in his “Memoirs” ([6], pp. 182-184) that it was very difficult to persuade authorities to change radically the direction of work. Finally the scientists succeeded, but to be on a safe side authorities created the special authoritative Commission whose task was to approve (or disapprove) the development of the Third Idea. This Commission chaired by Igor E. Tamm also included: Vitalyi L. Ginzburg, Yakov B. Zel’dovich, Mstislav V. Keldysh, Michael A. Leontovich, Andrei D. Sakharov, Isaak M. Khalatnikov ([7], p. 138). About the work of their commission Vitalyi Ginzburg writes in [1], p. 18: “*We just signed some document and if the “Third Idea” did not function after all, there would be I suppose serious consequences for us. As it is known there was no need to bring us to responsibility... The most important in this visit to Arzamas-16 was a chance to meet Venya and Lev. Zina made a photo of us...*”



*Vitalyi Ginzburg, Lev Altshuler and Veniamin Tsukerman
in front of the Tsukerman's cottage, Sarov, 1955*

Now I'd like to tell more about Veniamin Tsukerman.

In his Nobel Autobiography Vitalyi Ginzburg writes: *“In my life, like in the lives of many other people, friends have played an important role... I would like at least to mention all my friends and to express my warm feelings to them. But after some attempts I have made sure that I am not able to do it in a satisfactory way...”* [4]. One of the tasks of this Gift-Article is an attempt to tell about two friends of Vitalyi Ginzburg. Also Professor Norris Keeler asked me recently to provide information about Veniamin Tsukerman who is much less known in the West as compared to Vitalyi Ginzburg and Lev Altshuler.

“Veniamin Aronovich Tsukerman was an absolutely exceptional personality in his talents and in his life way”, - writes Vitalyi Ginzburg ([1], p. 16). He was born in 1913 in the Town of Vitebsk, which is also a native town of Mark Shagal. Beginning with 1928 Tsukerman continued his education in Moscow – see the very beginning of this Article. He had an inherited decease of eyes – rare form of pigmental retinitis which develops quite slowly. From the very childhood he could hardly see in the dusk, but did not pay much attention to it. He found out his diagnosis only in mid 30-th, being more than 20 years old: “Once I bought a newspaper and tried to read it. ‘Why are you holding the newspaper upside down ?’, - asked Lev Vladimirovich. – ‘When there is lack of light I practically do not see the text. There is something wrong with my eyes’ ” ([2], p. 21). Doctors said that nothing could be done and eventually he would become totally blind. This really happened, already in Arzamas-16, where Veniamin Tsukerman to the last his days headed one of central departments. In 1934 Veniamin Tsukerman married Zinaida Azarkh who heroically proved to be “his eyes” during all the life.

Tsukerman managed to adjust to gradual loss of sight: *“Lack of real visual information may be compensated by the memory and imagination – then mistakes may be brought to minimum. And there are many small wiles which are elaborated gradually; thus the need in help proves to be demanded only in the rare exceptional situations. When I invent I “see” schemes and constructions in their finest details. There is no problem in relating to constructors about the thought up device or scheme. For a long time I could sketch with chalk on a black paper. But eventually this possibility was also lost. Nevertheless people who worked with me not a one decade tell that discussing with me new ideas and constructions they practically do not feel my blindness”* ([2], p. 22). Even being totally blind Tsukerman read lectures to students and it was a rare case if somebody identified that the lecturer did not see anything. We lived in the neighborhood in Arzamas-16 and I remember well how quickly he moved over the room, and when he walked in a street being accompanied by Zinaida Azarkh, daughter Irina or by somebody else it was absolutely impossible to suppose that this is a blind person with a guide. He determined time by touching the dial of special watch. And he studied perfectly the art of the blindfold high-speed typewriting with two hands. Veniamin Tsukerman was one of the key persons in the Atomic Project, which was not a once noted by Yuli

Khariton and others (see e.g. in [1] and in special Issue of Journal “Atom” dedicated to Tsukerman [8]). About scientific work by Veniamin Tsukerman see in **ATTACHMENT**.

A special event was Petr Kapitsa Seminar in Moscow on 8 March 1944 in the Institute of Physical Problems where Yulyi Khariton and Veniamin Tsukerman presented their reports. Among listeners there were Abram Ioffe, Lev Landau, Igor Tamm, Nikolai Semenov, Yakov Zel’dovich, Sergei Vavilov, Ivan Obreimov. Khariton spoke about mechanisms of reactions in explosion, Tsukerman – about X-ray radiography of explosion. Tsukerman recalls: *“My report was met with big interest. Many listeners knew that our work was proposed for the State (then Stalin’s) Award. After the seminar Lev Landau came up to me and congratulated on the excellent work. Aleksander Shal’nikov asked me: “You so famously explained your X-ray films, so I conclude that now in Moscow you see much better than in Kazan’. Is it true?” – “Unfortunately not. Pigmental retinitis does not permit any reverse. I demonstrated these films many times and had accustomed to them. Also do you see these cuts at the edge of roentgenograms? I feel them well with the tips of my fingers. This permits to “show” faultlessly to the audience the parts of roentgenograms which deserve special attention” ” ([2], pp. 42-43).*

The life of Veniamin Tsukerman and Zinaida Azarkh was not an easy one not only because of his blindness. Their daughter Irina born in 1937 fell ill with tubercular meningitis in June 1946, but was mystically saved (see below) although she lost her hearing. That is why Tsukerman directed his powerful creativity at helping deaf people. He became one of founders of Surdotechnik in Russia, created “Visible speech” device for correction of speech of deaf people and people with poor hearing, etc. Tsukerman and his wife wrote the first in the USSR popular book for deaf people and about problems of deaf people [9]; the book was translated to Japanese and partly to English (see. Review by Irina Tsukerman “Assistance to deaf people” in [1], see also in ATTACHMENT below). And of course Veniamin Tsukerman and his wife spent a lot of efforts to educate, to develop their deaf daughter and reached fantastic results in it.

Also they had son Sasha who died in 1966 at an age of 17. His heavy illness and quick death were the immediate result of the young boy’s experience of brutal anti-Semitism at the entrance examinations to the Mechanical-Mathematical Department of the Moscow University. He was brilliant at math which he had studied in special physical-mathematical classes organized in Arzamas-16 by his father. And out of 13 school leavers of this year he was the only Jew and he was the only one who was given a bad mark at the entrance math exams at the Mechanical-Mathematical Department of the Moscow University. And he broke down. Andrei Sakharov writes about this tragedy in his Memoirs [6].

The epic of salvation in 1946 of the 9 year old daughter of the Tsukermans is presented in [10]. She proved to be the first child in the USSR saved from the tubercular meningitis; Selman Waksman, inventor of streptomycin, placed the photo of the nice girl in his famous book. I’ll tell the key events of the story. Ira fell ill in the last days of May, a few days later Professor Dmitryi Lebedev made a terrible diagnosis: incurable tubercular meningitis, death is inevitable in 3 weeks, “hundreds

of children die annually in Moscow from this disease” – said Professor. This was the end of a day. Of course Tsukerman’s called all the relatives and friends, the only hope was the mistake in diagnosis. *“All subsequent events were like shots of some fantastic movie, - writes Tsukerman. – In the evening I as usual switched on the radio. London. Scientific news in Russian: ‘In the USA new antibiotic, streptomycin, is discovered... physicians hope that it may save people from such an incurable disease as tubercular meningitis’. On the same day I twice heard this frightening combination of words. I immediately contacted the wife of our friend who works in tubercular hospital. Yes, she knows about streptomycin, they have a small amount of it in their hospital but so far have made only animal tests of it.”* [10].

In 2 days Tsukerman and their friends managed to receive 1 gram of streptomycin kindly given by Professor Lavrovsky (who received the medicine from American friends of Academician Zelinsky and who personally used it as daily 1 gram intra-muscular injections). But is it possible to save the girl with 1 gram, and how to use it? Academician Lina Shtern (the only survivor of the Soviet Jewish Anti-fascist Committee later exterminated by Stalin), Professors Yakov Rosin and Dmitry Lebedev said that streptomycin must be injected intracranially to the 4-th ventricle of the brain. Other physicians insisted on injection into the cerebro-spinal channel. And what doses must be used? Doctors suggested performing first the dog-tests. But the Tsukerman had no time and possessed too small amount of medicine. And the child was dying.

Tsukerman speaks: *“Thursday, 6 June was one of the most miraculous days in my life and in the life of all participants of this epic. Early in the morning Leonid Galynker, one of our closest friends called: ‘We must try to get in touch with the USA and to find out, to consult how the medicine must be used’”* [10]. Israil’ Solomonovich (in everyday life – Leonid) Galynker (1909-1967) was a fantastic personality. I was happy to know him closely (they were neighbors with my father’s place in Moscow) for a decade after 1956 when I came to study at the Phys. Dep. of the Moscow University and when Leonid Galynker was released after 7 years of imprisonment. Contrary to his friends and to many, many others Galynker never was a believer in socialism and was very sceptical about the Soviet Power. His twin-brother Iosif (talented chemist engineer who first introduced oxygen blast in metallurgy in USSR) was killed in Stalin’s purges in 1938, and Leonid hated Stalin with all his heart. His proposal to call the USA from the 1946 Stalin’s Russia was really a crazy idea. But it worked.

Tsukerman knew that streptomycin was used in the USA in Clinic of Brothers Mayo. This was the only information. The same day they managed to receive in the Academy of Sciences the permission for the call to the USA (in the existing extreme situation they met everybody’s readiness to help). Presidium of Academy of Sciences contacted Minister of Communications. The call to the USA was set the same day from 5 to 6 PM, from Tsukerman’s home telephone. Thus at the appointed time Veniamin Tsukerman, Lev Altshuler and Leonid Galynker gathered around the telephone in the corridor of Tsukerman’s apartment (this was a communal apartment shared with some neighbours). There were also an interpreter from the Academy and Chief of the Academy polyclinic. After an hour of joint efforts of Russian and American telephone girls they were

connected with Clinic Mayo, with Doctor Hinshow who first used streptomycin treatment of tubercular meningitis. But the hearing was terrible (a German submarine broke the sub-Atlantic cable and from Britain to the USA there was only radio connection). And it also turned out that the interpreter of the Academy did not know English sufficiently well. Then, after her vain efforts to speak with Dr. Hinshow, Leonid Galynker (who was the only English speaker among the friends) grasped the receiver from the interpreter and managed to exchange a number of crucial phrases with Dr. Hinshow, who in particular advised to inject 0,1 gram daily. Leonid repeated aloud in Russian his recommendations and doctor from policlinic put it down. At the end of the talk Leonid asked doctor Hinshow: "How are your patients?". – "I have two: the girl fell ill with tubercular meningitis 3 months ago, the boy – 2 months ago. They are alive so far", - that was his encouraging answer.

There were plenty of other efforts, several times Ira was near death, but after 11 months of the struggle the girl was saved, although the cost was heavy – she lost her hearing because of large doses of antibiotics. Many people helped to get more and more streptomycin. Also Leonid Galynker called Clinic of Brothers Mayo again from his home telephone for more consultations (like Tsukerman and Altshuler he worked in the Academy of Sciences and could arrange it). In the beginning of July 1946 Selman Waksman came to Moscow on the invitation of the Academy of Sciences of USSR. Tsukerman managed to contact him by telegrams beforehand and he smuggled out 30 grams of streptomycin for Ira. It was real smuggling because the Cold War began and Harry Truman prohibited the supply of new medicine to the USSR. Ira Tsukerman was the first, and in 1948 already 900 children in the USSR were saved by streptomycin from tubercular meningitis.

Leonid Galynker worked in the Energy Institute of the Academy of Sciences, he was a specialist of the world level on slates and peat; until now experts from other countries come to Russia to study his methods of use of slates. His is buried in the Novodevichyi Cemetery in Moscow (most prestigious VIP cemetery of Russia). They arrested him in October 1948 a few days after he defended his Doctor Thesis. Actually he was doomed to be arrested since he, just like my father, was free in expressing his views and emotions. But he was not protected by the Bomb. For example after USSR quarrel with Yugoslavia in 1948 his used to repeat the rhyme "Elki-palki barbaris dva Josefa podralis" ("Elki-palki barbaris two Iosifs scuffled", - the leaders of two countries Iosif Stalin and Iosif Broz Tito were meant). His favorite joke was: "I have a clever dog. When I say "Glory to the Soviet Union!" the dog stands on its hind paws and begs. And when I say "Glory to comrade Stalin!" the dog lifts its leg and piss". And he said it all to everybody and everywhere. He was a very joyful personality. After the arrest there were many days of the inquisitional interrogations. One of the main accusations was his "spy contacts" over telephone with the USA (consulting talks with Clinic of Brothers Mayo). When the investigator used to ask about his accomplices Altshuler and Tsukerman Leonid answered: "Arrest them and buy an atomic bomb in America". He was sentenced to death, spent 40 days in the condemned cell ("I passed this time in replaying Bach in my mind", - said he later; contrary e.g. to my father he had a good ear and excellent musical memory). After all they changed capital punishment to 25 years of imprisonment. He was released on 13 January 1956. When in 1948 Lev Altshuler and Veniamin Tsukerman learnt about his arrest (they already lived in Arzamas-16 at that time) they immediately petitioned for him

to their Minister Boris Vannikov. And during all the 7 years of his imprisonment they bombarded with their appeals and visited personally - with all their State rewards at the bosom - different tops in attempt to liberate Leonid. I remember well how in 1954 I accompanied Veniamin Tsukerman (who already could not move around the town himself because of his blindness) to the Military Prosecution Office. When the investigation was over Leonid said to his wife at the meeting in jail: "Irochka cost me much". And 7 years later when he met Venya and Ira after his release he said: "It was not for nothing".



Veniamin Tsukerman, Irina Tsukerman and Leonid Galynker, Moscow 1956.

* * *

The favorite motto of Veniamin Tsukerman, which he often repeated, was the famous saying by Marina Tsvetaeva "A Friend is an Action". And he was always ready to help and really rescued many people in quite difficult seemingly blind-alley situations. This motto and this readiness to help are typical for all the three friends whom this article is dedicated to. In particular I take a chance to express my gratitude to Vitalyi Ginzburg who back in 1983, when I did not work in the Lebedev Institute but was a street cleaner under menace of arrest, ignoring the evident violations of the rules signed without hesitation the "declassifying certificate" for my Article submitted from exile by Andrei Sakharov to "Doklady Akademii Nauk of USSR" (USSR Academy of Sciences Reports). And the Article was published, which in the essentially irrational situation of that time proved to be an important protecting measure.

Congratulating Vitalyi Lazarevich Ginzburg with his 90 years I wish him the inexhaustible creative energy to which "all the ages obey" (Pushkin).

ATTACHMENT

About Veniamin Tsukerman's scientific and inventive work:

In addition to ref. [2], [9], [10] the works by Veniamin A. Tsukerman and reviews of his scientific and inventive activity published in [1] are listed below.

Articles:

- V.A. Tsukerman, "Development of Impulse Roentgeno-Engineering", Journal "Apparatus and Methods of Roentgeno-Graphic Analysis", Iss. 24, 1980.
- V.A. Tsukerman, L.V. Tarasova, S.I. Lobov, "New Sources of X-rays", UFN (Uspechi Fiz. Nauk), **Vol. 103**, Iss. 2, 1971.
- V.N. Funin, V.A. Tsukerman, S.I. Lobov, "Roentgenostructure analyses with radioactive source of the characteristic X-ray radiation", Journal "Factory Laboratory", # 7, 1970.
- S.I. Lobov, V.A. Tsukerman, "Measurement of thickness of foils and thin films with use of soft X-ray radiation", Journal PTE ("Devices and Technique of Experiment"), # 4, 1963.
- V.A. Tsukerman, S.I. Lobov, N.G. Pavlovskaya, V.P. Ponedelko, "Contact microroentgenography of tissular truncations with use of radioactive Fe-55", Journal "Archive of Pathology", # 9, pp. 72-77, 1969.
- S.V. Samylov, V.A. Tsukerman, I.Sh. Model', "Irradiance of gases under impact of soft X-ray radiation", JETP ("Journal of Experimental and Theoretical Physics"), Vol. 34, Iss. 3, 1958.
- V.A. Tsukerman, "Radiooxygen O-15 and perspectives of its application in some fields of physiology and medicine", in [1] p. 277. – Exposition of the V. Tsukerman's Report at the Joint Session of the Academy of Sciences and Academy of Medical Sciences of USSR, 19 November 1980.
- V.A. Tsukerman, "Local influence upon neurons of the living brain with the convergent ultrasound and weak shock waves" (*"Dedicated to untimely lost son Sasha and friend Leonid Galynker"*), Journal "Biophysics", Vol. 16, Iss. 2, 1969.
- M.M. Levashov, V.A. Tsukerman, "Photographic method of registration and time presentation of nystagmus and volitional eye moves", "Journal of Ear, Nasal and Throat Deceases", Gosmedizdat, USSR, 1969.

Popular science Talks and Articles (in [1], pp. 305-347):

- V.A. Tsukerman, "Collective work in science researches and developments".
- V.A. Tsukerman, "Bullets, flies and ships".
- L.D. Danilin, V.A. Tsukerman, "Iron and X-rays".
- D.D. Ryutov, V.A. Tsukerman, "Water isolation".
- V.A. Tsukerman, "Automobile and hydrogen".
- V.A. Tsukerman, "Hearing, sight, human subject".

Reviews of scientific and inventive work:

- 1) Arkadyi A. Brish, "Unforgettable years, Sarov 1947-1955. Dedicated to Veniamin A. Tsukerman", Report at the International Symposium "History of the Soviet Atomic Project", HISAP-96, Dubna, 14-18 May 1996 (Publ. in [11] p. 172 & in [1] p. 290).
Headings of the Sections:

- “1. Discovery of phenomena of electro-conductivity of products of explosion of condensed explosives and of electro-conductivity of dielectrics under impact of strong shock waves”;
 - “2. Measurement of mass velocity of explosion products with the electromagnetic method”;
 - “3. Creation of impulse neutron sources for initiated atomic explosion”.
- 2) **N.G. Makeev, “Creation of impulse roentgenography in USSR and its application for studying of quick processes. Dedicated to Veniamin A. Tsukerman”**, Report at the International Symposium “History of the Soviet Atomic Project”, HISAP-96, Dubna, 14-18 May 1996 (Publ. in [11] p. 463 & in [1] p. 295).
- 3) **A.P. Zykov, N.G. Makeev, “V.A. Tsukerma – Merited Inventor of RSFSR”**, in the book [1] p. 301. Below are given some quotes and the List of Veniamin Tsukerman’s inventions from this Article: “During 50 years he achieved more than 60 inventions... Most of them determined new scientific-technological directions of work in the Nuclear Center – VNIIEF... More than 80% of welding junctions of the gas and oil trunk pipelines of USSR in 70-th - 80-th were controlled by impulse roentgen devices based upon technical proposals given by V.A. Tsukerman and his collaborators”.

“He did so much in the fields of science and engineering not connected directly with his principle work. Analyzing subjects of his inventions confirmed by the Certificate of Authorship (CA) they may be classified in the following way:

- Development of methods of impulse roentgenography and investigation of phenomena at shot and explosion (4 CA, coauthor Lev V. Altshuler). In 1942-1946.
- Development of portable impulse X-ray devices for scientific researches and application in industry and medicine (20 AC in collaboration with N.V. Belkin, N.I. Khomyak, K.F. Zelenskiy, I.A. Troshkin).
- Creation and examination of powerful electronic accelerators of direct action in megavolt range (10 AC, coauthors N.I. Zavada, I.A. Troshkin, K.F. Zelenskiy, O.P. Pecherskiy, et al.).
- Creation of devices for the X-ray structure analyses with use of Fe-55 radio-isotope for measurement of thickness of thin films, X-ray investigations and studying of solids at Venus (4 AC, coauthors S.I. Lobov, V.N. Funin, L.D. Danilin).
- Development of new method of neutron initiating of nuclear charges (9 AC, coauthors Ya.B. Zel’dovich, A.A. Brish, M.S. Tarasov, D.M. Chistov, V.A. Sokovishin, M.A. Kanunov, et al). In 1948.
- Development, creation and application of vacuum and Helium channels of the radiation leadout for underground nuclear physical experiments (4 AC, coauthors A.P. Zykov, N.I. Orlov, A.A. Razin, Yu.A. Trutnev, A.K. Chernyshov, M.P. Yutkin, et al). In 1964-1989.
- Development and investigation of powerful sources of ionizing radiation based upon high-current discharges of the plasma focus type in gases (3 AC, coauthors N.G. Makeev, G.N. Cheremukhin, Yu.P. Ivanov, V.M. Gerasimov, A.D. Demidov, E.I. Zharinov, V.K. Chernyshov, et al).
- V.A. Tsukerman’s inventions in other fields of instrument engineering (9 AC, coauthors M.A. Kanunov, I. Sh. Model, Yu.L. Stankevich, V.I. Gusakov, M.M. Levashov, et al).

4) **Irina V. Tsukerman, “Assistance to Deaf People” ([1], p. 337):**

«...My father’s passion during 40 years was his aspiration to help to people deprived of hearing. He is one of founders of Surdotechnik in our country... He insisted on creation in the Institute of Defectology of Academy of Pedagogical Sciences of the first in USSR laboratory of Surdotechnik... He created the “Visible Speech” device for correction of speech of people without hearing or with poor hearing. He was involved in solution of problem of telephone communication of deaf people... During long time he was the factual leader of new direction which he initiated: the

use of focalized ultrasound for stimulation of nerve structures of the organ of hearing, and also for therapy of some brain deceases... In 1968 and 1976 father approached top Communist Party leaders and newspaper “Izvestia” with a request to resolve the problem of distressful situation in our country in production of modern aerophones and other Surdotechnik... He was the first one who undertook serious attempts to make TV susceptible for deaf people with use of manual language and sub-titles. In 1967 he wrote to the Committee on Radio and Television with these proposals indicating that in the Western countries this is common practice... Together with my mother he wrote the book “One who does not hear” – the first popular book about problems of deafness. It became a desk book in the families of deaf people. The circulation 300 thousands copies could not satisfy all who wanted to have this book, which was translated also into Japanese and partly into English.”

Literature

1. “Scientist, Dreamer, Fighter”. Dedicated to Professor V.A. Tsukerman / Ed. Z.M. Azarkh, Russian Federal Nuclear Center - VNIIEF, Sarov, 2006.
2. Veniamin A. Tsukerman and Zinaida A. Azarkh, “People and Explosions” / VNIIEF, Arzamas-16, 1994.
3. “History of the Soviet Atomic Project. Issue 1” / Ed. V.P. Vizgin, Institute of History of Natural Science of the Russian Academy of Sciences, Moscow, 1998.
4. Vitaly L. Ginzburg, “The Nobel Prize in Physics 2003. Autobiography” / http://nobelprize.org/nobel_prizes/physics/laureates/2003/ginzburg-autobio.html From *Les Prix Nobel. The Nobel Prizes 2003*, Editor Tore Frängsmyr, [Nobel Foundation], Stockholm, 2004. (In Russian in the book Vitaly L. Ginzburg, “On Superconductivity and on Superfluidity. Autobiography” / “Physical and Mathematical Literature Publ.”, Moscow, 2006).
5. Vitaly L. Ginzburg, “About Science, Myself and Others” / “Nauka” - “Physical and Mathematical Literature Publ.”, Moscow, 1997. (Engl.: Bristol, IOP Publ. 2005).
6. Andrei Sakharov, “Memoirs”/ Alfred A. Knopf, New-York, 1990.
7. “History of the Soviet Atomic Project. Issue 2” / Ed. V.P. Vizgin, Institute of History of Natural Science of the Russian Academy of Sciences. / Sankt-Petersburg, 2002.
8. “Atom”, # 14, 2000 / Russian Federal Nuclear Center – VNIIEF.
9. V. Krainin, Z. Krainina, “One who does not hear” / “Znanie Publ.”, Moscow, 1987. (Real names of the authors: Veniamin A. Tsukerman and Zinaida M Azarch).
10. Veniamin A. Tsukerman, “Life or Hearing” / in the books [1], [9].
11. “International Symposium. Science and Society: History of the Soviet Atomic Project (HISAP'96), 40s-50s. Proceedings”. Ed. E.P. Velikhov at al., Vol. 2, “IZDAT”, Moscow 1999.

Boris L. Altshuler, PhD, Chief researcher, I.E. Tamm Theoretical Physics Department in the P.N.Lebedev Physical Institute of the Russian Academy of Sciences.