

**Remarks on Boris (a Russian) by Peter (an American)
in Toulouse (France):
Yes, physics is international !**

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Abstract

The author was deeply honored to be requested to give the after-dinner speech at the banquet held on 17 July 1998 as part of the conference "Classical Chaos and its Quantum Manifestations" in honor of the 70th birthday of Boris Chirikov. An unusual aspect of this after-dinner speech was its being given before dinner. The text has been edited to conform, as closely as possible, to the words that were actually spoken.

A reporter once asked the elderly Winston Churchill of Great Britain what in life was the most difficult test. Churchill replied, "To climb a ladder leaning towards you, to kiss a girl leaning away from you and third, to give an after dinner speech."

I avoid ladders leaning toward me. So far this evening, the opportunity to kiss a girl, leaning whatever way, has not presented itself. So my test is the third. It was an honor to be asked to address you after tonight's lovely banquet, though the organizers have just requested that I do so before dinner. Throughout the meeting, and especially tonight we join in celebrating the 70th birthday and science of our dear colleague and friend Boris Chirikov.

Most of you, as Boris's former students, collaborators, or friends could have been asked to speak tonight and, I'm sure, would have gladly agreed. Perhaps it's a bit strange that I, an American, have been recruited to celebrate here, in France, Boris, a Russian, before you all, who come from various corners of the world.

Ya na gaviru parruski, so I cannot honor Boris in his native language...

which reminds me of the story of two sheep who were grazing in a pasture. The first sheep said, "BAAAA." His companion looked up and replied, "MOOOO." The first sheep was rather surprised by this and asked, "What are you doing? Sheep don't say MOOOO; they say BAAAAA." "I know," replied his friend. "I was just practicing a foreign language."

So if I'm saying "MOOOO" where many of you would expect to hear "BAAAA", please bear with me.

For many people, birthdays are like glasses of wine: after you've had a few, you don't bother to count them.

But Boris gives us a way to measure his years: by his scientific development as a young researcher and later professor and mentor to his students and colleagues, by the productivity marked by his many important papers, and by the rich stories of his life. If I don't get them all without small errors, please forgive me.

Just a few facts. His birth was in Orel on the 6th of June 1928, so his boyhood came in the internal turbulence of the Soviet Union of the 1930's. With the father absent from their small family, he and his mother fled famine and went around 1936-7 to relatives in Leningrad, where they, of course, found more difficult times after the outbreak of war in Europe. In 1941 or 42 they were evacuated from Leningrad to the northern Caucasus, a region that about 4 months later was conquered and occupied by the German Army.

How many of you in the audience now have teen-aged children? (A show of hands indicated that many did.) My son Nathan is 13, the same age as Boris in 1941-2. Despite the trials of adolescent life in America, I know that my Nathan at 13 faces nothing like the wartime dislocations that came to Boris and so many others during the terrible wartime. Children should never have to face such things, but we still see around the world that they do. Let us all pray that human beings can learn to put such behavior behind them.

Less than a year later, the counter offensive of the Soviet Army moved the frontier westward again and liberated the region, but Boris soon faced sadness again. After a protracted illness, Boris's mother died around 1944. He was now an orphan. Fortunately for his future and ours, a teacher at his school took him into her home and life went on.

In fact, it was during this period near and just after the end of the war that Boris became the sweet man we have all come to know.

Sweet, you say? Well many years later, Peter Scherer, a young German physicist, recognized Boris's sweetness and coded it into the caricature he drew of Boris at the Les Houches theoretical summer school in 1989. Though I was not there, I know that a number of you here were. (The only transparency used in the talk was then shown. It was the caricature of Boris appearing in *Chaos and Quantum Physics*, M.-J. Giannoni, A. Voros, and J. Zinn-Justin, editors (Elsevier, Amsterdam, 1991, page 444).)

We all recognize Boris lecturing. But notice Boris's small listener, buzzing around feverishly. Maybe the question marks mean that this bee is not sufficiently educated, but the bee is certainly not stupid. This bee knows Boris's sweetness, for bees are drawn to sugar.

What does sugar have to do with the picture, you ask? Well, what you may not know is that from about 1944 to 1947 Boris's place in socialist labor was working in a sugar factory. Boris became quite the expert on sugar, and knows good and bad sugar when he tastes it.

(The speaker turned to Boris.) With that the case, Boris, let me present you with a small present. Please accept this small box of American sugar, but I do ask that after you try it, you do make public your referee report.

Let me jump forward tell you the story of how in 1987 I met Boris in his native land. In December 1986 I had been invited by telex (these were the days before widespread email and the Internet) to be a speaker at the IXth Vavilov Conference on Nonlinear Optics in Novosibirsk in mid June 1987. For this I was to be, for about two weeks, an official guest of the Soviet Academy of Sciences. Around that time it was also arranged that there would be a small workshop about two weeks earlier in Riga, then in the Latvian SSR. Therefore, my invitations to these meetings meant that I would change "status" while in the USSR, from an "ordinary" foreign person for the first week, around the Riga workshop, to an important guest of the Academy, for the last two weeks or so around the Novosibirsk meeting.

Well, Latvia was nice, the workshop hosted by Robert Damburg was small and wonderful, and there I met Boris as well as Dima, our co-host this time around.

After the Riga workshop, I underwent in Moscow the transformation from ordinary American to official guest of the Soviet Academy. A chauffeured car was made available to take me from lab to lab. Young scientists were assigned to shepherd me around. Emboldened, I decided to make a firm request. I wanted to travel to Novosibirsk by train, not by the Aeroflot flight already arranged.

No, no, they said. It's too far. Do you know how far it is, they asked? Sure, I said. About the same as from New York City to Denver, which in the USA I would never do. I'm too busy! It takes too long! But I have the time here, and I want to see your big country.

But we've no one to go with you, they said. No problem, I said. I'll be fine.

But you don't speak Russian, they said. True, I said, but I'll be OK.

Finally, my polite firmness won out, and the train travel was booked. On train number 7, the same tracks as the Trans Siberian Railway, I'm told. A soft car, with me alone in the compartment. A kind young Moscow physicist donated a copy of a Russian phrase book prepared in English for the Moscow Olympic Games, which the USA and some other countries had boycotted. I suppose that meant that lots of phrase books were left over.

Anyway, off I went. The view out the window of my train compartment was wonderful, and at mealtimes I did manage to find the dining car, where the kind people really looked after me. 53 hours later (I think it was), on a Sunday evening, I arrived in Novosibirsk. This turned out to be quite an event. First, no one told me that the Soviet trains traveled on Moscow time! According to the time schedule on the wall of the train, I thought I would be arriving in the afternoon in Novosibirsk. Out on the train station platform, I noticed that the sun was suspiciously low in the sky. It was definitely not afternoon. And the big digital clock on the Novosibirsk hotel did not say the time that I expected. It said 20 hours as I recall.

Moreover, as all the passengers leaving the train walked away on the platform, it became clear that no one was at the station to meet me.

What to do?

Well, having been in the USSR already for nearly two weeks, I now recognized the uniforms. I walked up to a blue one, a Militsia officer, cleared my throat, and said, "Amerikanskii. Ya na gaviru paruskii." What a look on his face. I'll never forget it! He started to speak to me in Russian, but then, realizing the futility, he stopped.

I showed him the one piece of official paper I had with Cyrillic letters on it. It was a letter written in English from the conference organizers, but it was on the official letter paper of the Institute of Thermal Physics (Institut Teplofiziki). The Militsia officer took my precious piece of paper, read the Russian top of it, and evidently got his plan. He took me to the head of the taxi queue, spoke to the taxi master, and got me put in a taxi to go to Akademgorodok. The taxi driver had my precious piece of Russian paper.

Just as the sun was nearly setting, we arrived in Akademgorodok. Of course, the taxi man took me to the institute. That was what was printed on the top of my letter. But it was Sunday night. The institute was closed! Which the taxi driver soon discovered after getting out of the taxi and knocking on the front door. He returned to the taxi, looked at me, and shrugged his shoulders, as if to say, "What now, Amerikanskii?"

Something made me think of looking in my American "Fodor's Guide" to the Soviet Union. Listed under Akademgorodok was the name of only one hotel. I said this to the taxi driver. He asked some people walking by where it was, and then quickly drove to it. It was only a block or two away.

On the outside of the hotel, I could see in English a sign that said something like "Welcome to the IXth Vavilov Conference". We had found the right place.

After a good night's sleep in my room, I was in the hotel lobby the next morning when all the Soviet scientists from Moscow showed up after their very early morning flight from Moscow. I don't recall who it was, but when one of them saw me sitting there in the lobby, all the color drained out of his face. He came up to me and said, "You're here! You weren't supposed to arrive until today! How did you get here? No one was here to meet you!"

I just smiled and said, "It's a long story, but I got here just fine last evening."

A couple of other Moscow scientists recognized me and came over to talk. I remember clearly one asked me, "You took the train all the way from Moscow. How was it?" I said, "It was wonderful." He said, "Really? I've always wanted to do this!"

That is how I got to Novosibirsk in the early days of glasnost and perestroika.

Now two short stories from the Vavilov Conference, one about Dima and one about Boris.

The Plenary Talks were held in the Large Auditorium, where earphones were supplied at every seat for simultaneous translation (just like the United Nations). If you spoke in Russian, it was translated to English, and vice versa. Well done, too. The translators must have known some science because they seemed very good to me.

The Seminar talks that were held in the evening, upstairs in smaller rooms, were different. I still have the conference program, and the following occurred on Thursday evening in the seminar "Rydberg states and strong field". The session chairman, listed in the program as I.M. Beterov, opened the session in English and asked all speakers to give their talks in English because of the Americans and other foreign scientists present, even though we were fractionally small in number. Well over 90% of those in the room were Russian speakers! In the middle of Siberia, I was surprised.

The first speaker was Dima Shepelyansky, and as always, he did very well, both with the science and with the English. The second speaker was Nikolai Delone, from Moscow, who speaks French well but not English. He said a few words in Russian to Dima, and Dima announced, in English, that the speaker, Delone, would speak in Russian but had asked Dima to translate into English. Dima had evidently not expected this, but he agreed to do so.

I remember Nikolai's talk well. He used lots of words but only one transparency. After every minute or so of talking, he would stop for Dima to translate. Dima would say, "The speaker says blah blah blah" Dima was evidently struggling, not with the English but to understand just what the science was he was supposed to be translating. During the third or fourth chunk of Russian that Nikolai presented, I saw a pained look come on Dima's face. It was clear why Dima looked this way, because he opened the translation of this part by saying, "The speaker says, but I do not agree with this part!" The words coming out of Dima's mouth were Nikolai's, but Dima could not agree with them and wanted to make sure that the audience knew this.

As I recall, it was the next Russian speaker who started his talk with a few words of English that said, "I am Russian. I do not speak English well. I will not give my talk in English. I will give my talk in Russian!" He must have said this in Russian immediately after this, because these words brought a cheer from the audience. Another Russian Revolution! But this time, no fighting nor bloodshed.

As it happened, I was sitting next to Boris at this seminar, so Boris just leaned over to me and whispered in my ear, "I will translate for you." And so he did, most skillfully summarizing in a few words the important point after each few sentences of the speaker.

I don't recall if it was our revolutionary speaker or the next Russian one when the following happened. The speaker began, in Russian, and Boris started translating for me. After a few minutes into the talk, Boris leaned over especially close and whispered to me something like, "The speaker is very confused and doesn't understand what he is talking about, so I will stop translating what he is saying."

Now, let me tell you, this is an efficient way to attend a seminar: not only simultaneous translation, you also get an analog filter on the science! Boris is not one to avoid voicing his opinions.

Nor is Boris one to avoid making insightful decisions, as the early part of his career shows. We know Boris as a theorist, indeed the Director of the Theoretical Division of the Institute of Nuclear Physics. But I find it fascinating that he started his career as an experimenter!

In his 5th year of studies in what became the Moscow Physicotechnical Institute, he was a student-apprentice researcher in the Heat Engineering Lab, now called the Institute of Theoretical and Experimental Physics. After graduation around 1952, he was invited to remain there. His project involved a Wilson cloud chamber for high energy particle tracking and identification. You recall, photographs were taken of tracks of droplets that formed in the supersaturated vapor after the passage of ionizing radiation. The photographs had to "scanned", work that was tedious and time-consuming for the girl technicians. Boris's simple, time-saving proposal was they should count the number of gaps. This was statistically related to the number of drops, but it could be done more quickly.

As Boris told us yesterday, he agreed to transfer in 1954 to what was later called the Kurchatov Institute of Atomic Energy. Actually, he was recruited there by the theorist Andrei Mikhailovich Budker, who had earlier taught the student Boris.

With his first research student Volosov, Chirikov did crucial experiments on the limiting current of electron beams. It was here that Boris's interests in nonlinear phenomena and stochastic processes began.

In 1958 Budker was selected to form the new Institute of Nuclear Physics at the new Akademgorodok (Academy City) being constructed outside Novosibirsk, and the actual move there two years later took the team, including Chirikov, to Siberia.

Boris first presented his results on the stochastic instability of magnetically confined plasma at the Kurchatov seminar in Moscow in 1958, when the plasma research was classified secret. Only after the London plasma conference of 1958 did the results become public, and Kurchatov ordered the plasma results to be published quickly. This led to Boris's celebrated 1959 theoretical paper in a special issue of the journal Atomic Energy. Boris had started his career as an experimenter, but the world would now know him as the theorist who invented the resonance overlap criterion.

What you may not know is the story of the writing of the paper in the same journal issue that describes the related plasma experiments of S. Rodionov. Though Rodionov's name appears as the sole author, the paper was written by Chirikov.

Why? The story goes that Rodionov had broken his right hand (probably during skiing) and was in the hospital. Boris was ordered by the KGB to take his secret notes, go to the hospital, and write the paper from the words of Rodionov. The KGB orders included that Boris take a weapon, a revolver, to ensure the security of the secret documents, but Boris refused, arguing that it would be too dangerous to take a revolver on the public buses that, in those days, were always very overcrowded with people. Finally, the KGB agreed that Boris would not have to carry the revolver, but he was obliged to return all his notes, including the "Rodionov manuscript" back to the secure place.

What we now all know as the "Chirikov resonance overlap criterion" came as a result of Boris's generalizing the theoretical analysis he had first performed for the stochastic instability of confined plasma. Apparently, the first full experimental confirmation of Boris's criterion came at the end of the 1960's, with experiments in Novosibirsk on circulating electron beams.

Chirikov's later widespread and continuing interactions with Western scientists was certainly stimulated by the pioneering results of Chirikov that, fortunately, were published in the open literature and that I have described briefly. However, how each of Boris's personal relationships with Western scientists began and developed depended, of course in those times of Cold War, on the occasional interruption by more openness.

Boris's long association with Joe Ford of Atlanta, USA, began when Boris and Joe met at a conference in Kiev in 1966. We are all sad that Joe is no longer with us and cannot be here.

Alerted by Ford, Giulio Casati from Milano visited Novosibirsk in 1976 and began a long collaboration with Chirikov and his students that continues up to the present day. As we all know, this circle even widened to the younger associates of Ford in the USA and Casati in Italy.

Let me begin to close by reading some of the reminiscences sent to me on July 3rd by another of Boris's many friends and collaborators, Andy Sessler of the Lawrence Berkeley Laboratory in the USA. As it turns out, Andy is, this year, President of the American Physical Society, but it is clear that his remarks are of a personal nature.

I shall read from Andy Sessler's remarks, a copy of which I have just given to Boris:

I first met Boris in March of 1965 when Budker invited a small number of people (about 12) to Novosibirsk to discuss the technical aspects of storage rings. At that time he told me about his new work, which was unpublished (I believe) at that time and has subsequently become known as the 'Chirikov criteria'.

We 'hit it off together' and ever since then have been good friends. At that time we did a number of 'fun things' like spending evening Under The Integral Sign (a scientific club; really an eating club and night club) and also going cross country skiing. To do that one checked out skis, of course free in those Soviet Days, and that was done one afternoon. Then, the next day, we went to the ski area. The ski area was a small hill (this was Siberia) covered with pine trees. The Soviets could change direction while going down hill, but the Americans were doing their best just to stand up on their skis. That meant that in order not to hit a tree you had to point your skis correctly, before you started down the hill, to about

a milliradian. I was doing that fine through most of the afternoon, but then I mis-calculated and hit a tree. I broke the tip of the ski off (and was damn fortunate not to have broken anything else) and remember walking, through deep snow, for what seemed like miles and miles. For many years I had the ski tip as a souvenir of my first meeting of Boris.

Some time later, in 1967, I was spending the year at CERN and Boris visited us. My chance to get even. I suggested that we go to Zermat and do a bit of real (down hill) skiing. So my family (5 of us) and two Soviets, Boris and Ben Sidorov (now deputy director of the Budker Institute), piled into my car and drove from Geneva to where one takes the train to Zermat.

The next day was terribly cold and everyone, except Boris, decided not to try and ski. Boris was not going to miss out on anything and I, as host, felt I must go with him. Me in lots of down and him in a simple sweater. Well, it was really cold. We rode the lift up, skied down and when I took off my gloves my fingers were all white. Boris rushed me to a first aid station and proceeded to rub snow on my hands. Well, he saved my fingers, sent me in for the day, and continued to ski all day, coming in, at the end of the day in fine form.

Through the years we continued to send cards (as well as scientific papers) and I remember one where Boris said it was 40 below and he had stopped skiing. Not to be out done, I sent back a card saying that the Soviets might stop at 40, but Americans certainly kept skiing. He then wrote back saying that I didn't understand: it was the skis that stopped working when it got so cold."

Boris and I, did, once write a paper together. Well, Boris really did all the work, but I do remember a very pleasant day working—for some reason—in his kitchen. Boris had the idea that there hadn't been a paper since World War II co-authored by a Russian, German, and American. (I don't know if this was true or not, but it was an interesting thought.) So, we invited Eberhard Keil into the collaboration."

Once, Boris's wife, Olga, was 'allowed', I think that is the right term, to go on a vacation consisting of a cruise on the Black Sea (and maybe also the Mediterranean). The cruise was for artists (she was a well-known opera singer). The first leg consisted of air to Moscow and it was arranged that she and I went together. In Moscow she escorted me around, including a very lengthy tour—and very special tour led by a friend of hers—to the Tretyahov Gallery. All very good, but she didn't know a word of English and I don't know a word of Russian; we just smiled at each other for a few days."

Boris, I hope you have a great time at this Conference at which your 70th birthday (how can we all be so old so soon?) is properly noted. The honor is richly deserved. I feel touched to have had my life touched by you."

— Andy Sessler

And now, I will close my talk directly to Boris:

Boris Valerianovich, my vashi družya zhelaem vam prodolzhat' prodvigatsya po puti resheniya fundamentalnykh problem.

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